

Economics of Khaddar

By E. 2/218.
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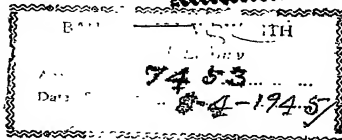
S. GANESAN.
PUBLISHER, TRIPLICANE, MADRAS.
1928

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INTRODUCTION

In former days India was regarded as a very rich country, and prior to the Mohammedan conquest, at least, the wealth was widely distributed among her people. The fame of her products and riches had been known in Europe since the days of Alexander the Great. Hopes for a share of this wealth were, indeed, the primary stimulus for the discovery of America and for the great activities in navigation, exploration, trade, banking and even politics, which have all played so large a part in European history.

But now, although India is still considered a source of much wealth, the Indian people are ranked among the poverty-stricken of the world. It is difficult to measure their actual poverty in terms comparable with conditions in Western countries. In the West, wealth and poverty may be fairly assessed in terms of capital assets, money income, bank clearings, prices and cost of living. But in India certain conditions tend to make these means of measurement inadequate. The habits of the joint-family system still prevail enough to help spread the burden of extreme destitution. (But note that this does not increase the wealth). The reli-

gious duty of charity is strongly felt and acted upon. Caste and inter-caste sharings mitigate certain hardships. Barter and payment in kind are still sufficiently prevalent among certain occupations and in certain districts to make money incomes only a partly reliable guide. Credit instruments are not used anywhere near as widely as in the West. Where so large a part of the people are farmers, much of the income is directly in food. Except in winter in the north and in the hills, the tropical climate almost eliminates the need of fuel for warmth, and permits much simplicity of living arrangements.

Nevertheless, making all fair allowances, the fact of wide-spread, grinding poverty is undeniable. Its evidences are far more apparent in the villages than in the cities, and therefore are not fully disclosed to the casual traveller. Yet it is in the villages and country regions, mostly away from the railways, that 90 per cent of the population live. Just as in all countries, public health and vital statistics are a fair barometer of poverty, despite recent attempts to load all the blame in India on to the custom of child marriage. The average expectation of life among Indians is the lowest of any nation in the world and seems to be decreasing still further; infant mortality is abnormally high; disease rates are excessive. The almost universal illiteracy in the villages is itself in part an evidence of poverty. The extremely small size and extensive fragmentation of farm holdings is another evidence as well as cause of poverty. The extent of personal debts, the prevailing rates of interest, and the whole small money lending system are

appalling to contemplate. All surveys of living equipment of typical peasant and city working-class families reveal very slender assets. The old statement about huge imports of silver and gold bullion, hoarding, stores of buried treasure and family jewels looks foolish when the annual and cumulative net import figures are divided by the figures of total population, and it is realized that cheques and other instruments of credit are very slightly used among Indians, so that much more coin is needed for mercantile transactions than in the West, and that certain allowances must be made for wear of coins, and that comparison should be made with per capita amounts of precious metals for all uses in Western countries. Practically all investigators with experience in social and economic surveys who have studied the actual conditions in both villages and cities are agreed that destitution is exceedingly great and widespread. As Professor Gilbert Slater of Madras University says, "The poverty of India is a grim fact." *

With all these qualifications in mind, we will nevertheless cite the available data as to annual per capita income. Though inadequate, for the reasons given, they nevertheless give us, perhaps, the best basis for, brief estimate of conditions compared with other countries. They may be said to at least give an indication of the state of mind of the Indian who is comparing his condition with that of his Western brethren. And as comfort is partly a subjective condition, these figures and the state of mind they connote are perhaps as

* Introduction to P.P. Pillai's *Economic Conditions in India*. Routledge, London, 1925.

fair a rapid quantitative index of the situation as is available.

The annual per capita income in India is extremely low. The estimates made since 1900 by British and Indian authorities range from Rs. 30 to Rs. 116. The estimate of Rs. 30 per head was made by Lord Curzon, then Viceroy of India, in 1901. The most recent estimate, made in 1925 by Prof. Ghose of Calcutta University, was Rs. 46-6. Very few Indian economists or investigators will concede that the per capita income is over Rs. 50 per annum, and out of eighteen such estimates only three exceed Rs. 60, and two of these were made by the same man at different times.*

Detailed budget studies in villages yield similar results, ranging from Rs. 44 in the Deccan (Dr. Mann, 1917), Rs. 52 in Bengal (J. C. Jack, 1906-10), Rs. 72 in Madras (Prof. Slater, 1916-17), to Rs. 100 in the Punjab (M. L. Darling, 1925).

* For a list of these estimates and comment, see *Mysore Economic Journal* for April, 1925, p. 177; also S. V. Puntambekar and N. S. Varadachari *Hand Spinning and Hand Weaving*, published by All India Spinners' Association, Ahmedabad, 1926, pp. 130-133.

For detailed study and comment on Indian poverty and its causes see H. H. Mann—*Land and Labour in a Deccan Village*, Oxford University Press, Vol. I, 1916, Vol. II, 1921; M. L. Darling—*The Punjab Peasant in Prosperity and Debt*, Oxford Univ. Press, 1925; *Wealth and Welfare of the Punjab*, by Mr. H. Calvert, Registrar of the Co-operative Department of the Punjab Govt.; *Study of Economic Conditions in Bombay Presidency* also by H. H. Mann, Agricultural Expert to the Bombay Presidency Govt.; *Economic Life of a Bengal District* by J. C. Jack, then Land Settlement Officer to the Bengal Govt., 2d. ed., 1907, Oxford University Press; S. Higginbottom. — *The Gopet and the Plein*, Macmillan, New York, 1921; Gilbert Slater—*Some South Indian Villages*, University of Madras Econo-

In terms of British money, Rs. 50 would be about £3/15. and in United States money about \$ 18.50. By contrast, the annual per capita income in the United

mie Studies, Oxford Univ. Press, 1918; Venketasubrahmanayan—*Studies in Rural Economics: Vazhamangalam*—Natesan & Co., Madras, 1927; B. G. Sapre—*Economics of Agricultural Progress*, Sangli; S. K. Iyengar—*Studies in Indian Rural Economics*—P. S. King & Son, London, 1927; R. Mukerjee—*Rural Economy of India* Longmans Green, London, 1926; Brij Narain—*The Population of India*, publ. R. Krishna, Lahore, 1926; *Economic Conditions in India* by P.P. Pillai, Member of the Economic and Financial Section, League of Nations Secretariat, Geneva, Routledge, London, 1925; E. D. Lucas *Economic Life of a Punjab Village*, Lahore, 1922; S.S. Aiyar—*Economic Life in a Malabar Village*—Bangalore Printing and Publ. Co., Bangalore, Mysore, 1925; G. Keatinge—*Rural Economy in the Bombay Deccan; Enquiry into Working Class Budgets in Bombay City*, Govt. Labour Office, Bombay, 1921-22; *India in 1923-24*, edited by Rushbrook Williams, then Director of Public Information, Govt. of India, pp. 186, 190, 197 198; *Material and Moral Progress of India*, Report for 1922, p. 198, Royal Stationers Office, London, Cmd. 1961 of 1923; W. S. Thompson—*Britain's Population Problem as Seen by an American*, *The Economic Journal*, London, June, 1926; *The Indian Rural Problem*—Anon. (perhaps S. Higginbottom of Allahabad) in *The Round Table*, London, June, 1925; R. K. Das—*Wastage of India's Man Power*,—*The Modern Review*, Calcutta, April, 1927; N. N. Gangullee—*The Problem of Rural Life in India*,—*Asiatic Review*, July, 1925; *Report of the India Advisory Committee of the Independent Labour Party of Great Britain*, 1926, London. See also the Reports and Evidence given before various Governmental Committees and Commissions, such as The Indian Economic Enquiry Committee, 1925; Committee on Co-operation in India (MacLagan Committee), 1915; Indian Industrial Commission, 1916-17; Indian Constitutional Reforms Committee (Montague-Chelmsford Committee) 1924; Indian Taxation Enquiry Committee; Royal Commission on Agriculture in India, 1927; Famline Commission Reports. Also Annual Reports of the Indian Public Health Commissioner. The above list is not exhaustive.

INTRODUCTION

States in 1926 was reliably estimated at \$ 770, and \$ 2,010 for each person gainfully employed. That second category does not include housewives or women and children helping the head of the family on the home farm.* In terms of Indian money, \$ 770, is, at existing exchange rates, about Rs. 1,925, while \$ 2,010. is Rs. 5,025.

Recent figures as to real wages in India, Great Britain and the United States are not available to us. *The Bombay Labour Gazette* for September 1926 gives the following comparative cost of living index numbers for India, the United Kingdom and the United States.

COST OF LIVING INDEX NUMBERS.

	India (Bombay)	U. K.	U. S. A.
July, 1914	100	100	100
" 1915	104	125	105
" 1916	108	148	118
" 1917	118	180	142
" 1918	149	203	174
" 1919	186	208	199
" 1920	190	252	200
" 1921	177	219	174
" 1922	165	184	170
" 1923	153	169	173
" 1924	157	170	173
" 1925	157	173	174 (June)
" 1926	157	170	—

* Estimate by National Bureau of Economic Research (U. S.), quoted in *Literary Digest*, New York, for March 5, 1927.

These figures look favourable to India, but one must remember that there the margin above subsistence is on the average practically nil.

For certain retail commodities in Indian cities a rupee may be considered, in purchasing power for an Indian, as roughly equivalent to four shillings under conditions found in Great Britain, or to one dollar under American conditions. In the villages, the equivalent purchasing power of the rupee is perhaps still greater. Of course, under tropical conditions, human wants may be greatly simplified; but the life of certain races and tribes in temperate and frigid zones proves that it is almost equally possible under any conditions. But an annual income of £ 10 or \$ 50, or even twice as much, would not be bearable by an Englishman or American of any group or class.

In a recent interview granted to the *Times of India* (see issue of Oct. 22, 1927), Dr. Harold H. Mann, the retiring Director of Agriculture in Bombay Presidency, is quoted, in part, as follows :

“He had no hesitation in saying that although the standard of living of the agriculturalists had undoubtedly improved, he could not say that the majority of the people were living up to that standard. His inquiries had shown, in fact, that fully 75 per cent of the people in the famine districts were living so much below their own standard that their economic position had to be reckoned as unsound, whilst even in the areas which were looked upon as reasonably prosperous, there was only 66 per cent of the people in a sound economic position.

He admitted that it was most difficult to make any detailed observations on this point because there was so little data to compare notes, but his candid opinion, after twenty years careful investigation and observation, was that in these two decades the standard of life in the villages had improved but the actual relationship of the bulk of the people toward that standard had not improved.".....

In 1922, Mr. Rushbrook Williams, then Director of Public Information, Government of India, wrote, "The majority (of the Indian people) are poor and helpless beyond Western conception"*. Again, in 1924, he wrote, "But although it seems quite possible to maintain with fair degree of certainty that the masses of the Indian population, at least in some parts of the country, are gradually improving in their economic position, it must be borne in mind that a very large proportion of the inhabitants of India are still beset with a poverty of a kind which finds no parallel in the more exigent because less tropical climates of Western lands. Such improvement as is taking place proceeds with painful slowness."†

According to the *Lahore Tribune* of August 17, 1927, Lord Sinha, former Governor of Bihar and Orissa, drawing attention to the recent discussion on Indian affairs in the House of Commons, said, among other things:

* *India in 1921-22*, p. 191: A Statement prepared for presentation to Parliament in accordance with the requirements of the 26th Section of the Government of India Act (5 & 6 Geo. V, Ch. 61), Government of India Central Publication Branch, Calcutta.

† *India in 1923-24*, p. 193, Govt. of India, Central Publication Branch, Calcutta.

"The fact remains that material progress has been very slow. It does not seem to me, speaking again for Bengal only,* that the people are in any way better off than they were, say, thirty or even fifty, years ago. Indeed, it really seems to me that they are worse off." Mr. Gandhi holds that this is also true of the vast majority of Indians in the other provinces also.

The Indians are a meek and patient people, but it is not surprising to find that now many of them exceedingly dislike this state of affairs and are trying to find a way out. Many schemes have been proposed and are being tried out. One of these, the khaddar or charkha movement, proposed by Mr. Gandhi and now being operated by him and his followers, consists of an attempted revival of indigenous hand-spinning and hand-weaving, the stress being chiefly on spinning. Handweaving, without qualification as to the kind of yarn used, has more than held its own during the last 15 years or more and has received encouragement and support from several provincial Governments.

This project has both staunch adherents and vigorous adverse critics. Both in India and elsewhere it has roused so much discussion that it seems worth while to examine still further in some detail the question of its economic validity. As one plump Bihari merchant asked us, "Will it pay in rupees, annas and pies?"

* The population of Bengal, according to the 1921 Census, was 45,695,000,—nearly equal to that of Great Britain.

† For the reader who may be unfamiliar with India,—it may be mentioned that khaddar or khadi is hand-woven cotton cloth made of hand-spun yarn. The charkha is the indigenous hand-operated domestic spinning wheel.

This little book is an attempt to discuss and, if possible, answer that question.

To almost all Europeans and Americans and to most others who have had a Western education or much contact with Western civilization, the question seems absurd. Modern machine industry and commerce are so powerful and world-wide; materials produced by power-driven machinery are so cheap in price and of such quality and so widely distributed, that an attempt to compete with them on any large scale seems foolish.

Isn't it preposterous to try to turn back the clock and revert to such primitive implements,—to say nothing of expecting any good to come of it? How can a man like Mr. Gandhi, apparently so sincere and honest in other ways, thus play on the credulity of the ignorant Indian peasantry? Surely such a movement is foredoomed to failure. "Misguided zeal," "blind leader of the blind," "reactionary," "crank," "stupid," "insane," "childish," "fantastic," "deluded," "an unproved economic fallacy," "an antiquated and unprofitable method," "futile hope," "suicidal attempt," "flying in the face of all modern scientific knowledge and progress;"—such are some of the phrases applied to the idea or to its founder and upholders, by various advisers and critics.

Most people believe that it is useless or definitely a mistake for anyone, and perhaps least of all for Indians, to do anything but buy their cloth in the cheapest markets. They think that, whatever ways there may be for India to increase her wealth, to attempt to increase her output of textiles by hand is not one.

This little book is a statement of how the project

looks to one who had seven years of practical work and study in industrial and labour problems in America, (much of it in cotton mills) together with two and a half years' study in India of the khaddar movement. The latter period included observation both in the villages and at the headquarters of the movement. The investigation was undertaken primarily to clarify my own thinking. The ideas are not original, though perhaps their synthesis in this context is new in part. For all that has gone into the book I am indebted to all the world.

The book is far from complete, but I have tried to cover the main points, and have made references to sources whence further information may be obtained. It proved impossible, with my facilities, to get all the statistics up to date, but I do not think that the conclusions are thereby invalidated.

One thing is certain, that Indian tropical and village economic organization and methods are very different from those of temperate climates and predominantly urban regions. How great the differences are, it is almost impossible to realize until one has actually experienced both for a considerable period of time.

With that in mind, I hope the reader will kindly suspend judgment until he has examined all the evidence here presented.

KOTGARH
SIMLA HILLS, INDIA. }
November, 1927.

R. B. G.

ECONOMICS OF KHADDAR

CHAPTER I
THE ENGINEERING ASPECT

In these days the wealth and welfare of nations seem to depend largely upon their ability to produce material goods. Such production requires much machinery and vast use of physical power. For example, we learn that certain countries are now using the following amounts of horse-power units per individual workman : *

United States	3.6
England	2.4
Germany	1.5
France	0.97
Italy	0.31
China	0.12

The wealth of these nations would probably be found to rank in about the same order, aside from certain hampering political restrictions affecting Germany.

Mr. Henry Ford writes †, "The source of material civilization is developed power. If one has this developed power at hand, then a use for it will easily be found. One way to use the power is through a machine, and

* From an advertisement of the Duke Power Co. in *The Literary Digest* (U. S. A.) for May 7, 1927, p. 91.

† *Today and Tomorrow*, Heineman, London, 1926, p. 167. Mr. Ford is quoted in this book because he is an independent thinker, a self-made business man and manufacturer whose policies have proved exceedingly successful in many countries and therefore probably have considerable economic validity and should carry some weight.

just as we often think of the automobile as a thing of itself instead of as a way of using power, so also do we think of the machine as something of itself instead of as a method of making power effective. We speak of a 'machine age'. What we are entering is a power age and the importance of the power age lies in its ability, rightly used with the wage motive behind it, to increase and cheapen production so that all of us may have more of this world's goods. The way to liberty, the way to equality of opportunity, the way from empty phrase to actualities, lies through power; the machine is only an incident."

Note that idea:—the right use of power is the important thing, the machine is only an incident. We will come back to it later.

Again, the British Reconstruction Committee Interim Report on Electric Power Supply in Great Britain, 1917, says in part:

"It is obvious that improvement in the commercial prosperity of a country—that is to say, the average purchasing power of the individual—depends upon increasing the output per head. . . . The only way to increase prosperity is to increase the net output per head of the workers employed. . . . The best cure for low wages is more motive power. Or from the manufacturer's point of view, the only offset against the increasing cost of labour is the more extensive use of motive power. Thus, the solution of the workman's problem, and also of his employer is the same, viz., the greatest possible use of power. Hence the growing importance of having

available an adequate and cheap supply of power produced with the greatest economy of fuel." *

If the truth of these statements be granted, it is sound economics to urge the immediate installation of machinery to use more of the power now available in India.

But first of all let us be good business men and examine the various kinds of machinery and power available. † One kind may be more efficient than another or less expensive in the long run; considering such factors as first cost of installation, cost of maintenance, cost of power, skill required of workmen, together with the kind and amount of products desired and the ability of the markets to consume the product and thereby pay for the costs. For example, if a manufacturer is situated near a big waterfall, it would probably be foolish for him to instal a steam power plant: while if his factory is near a good coal mine, obviously a steam power plant is his best source of power. Or to instal a 50,000 horse-power plant when the available profitable markets will absorb only the product of 30,000 horse-power would clearly be a mistake.

Following Mr. Ford's idea that the right use of power is more important than any particular kind of machinery, let us briefly examine the fundamentals of physical power and its utilization and then apply that

* Cf. also James Fairgrieve—*Geography and World Power*, University of London Press, 1925.

† Cf. W. N. Polokov—*Mastering Power Production*, McGraw-Hill & Co., New York City, 1919, p. 34.

as a test for the validity of the khaddar proposal. We will first state the whole engineering argument in brief, and then consider it in more detailed fashion.

All physical power is derived ultimately from the sun. Coal and petroleum are, in effect, reservoirs from the stream of solar energy of past ages, converted and stored up by vegetation. Water power comes from the action of sunshine evaporating water from the oceans and transporting it to the land and rivers in the form of clouds and rain. Even the mechanical energy of horses and cattle and man himself comes from food obtained from plants activated by sunshine. All the power used in modern industry and in the economic activities of man in past ages came from his using some part of the never ending stream of solar energy. The old Rig Vedic hymns sang rightly of Savitar, the sun god : "Savitar... Lord of every blessing;" and "God Savitar, the gold-eyed, hath come hither, giving choice treasures unto him who worships." (R. V. x, 149 ; i, 35).

Any scheme which utilizes and efficiently transforms solar energy to a greater degree than was being done before is sound, from an engineering standpoint, and also from an economic point of view.

We do not usually think of the charkha as a machine, but it really is so. It uses the available mechanical energy of a man, woman or child for producing material goods. The hand-loom does likewise. That mechanical energy is derived from the food eaten by the person. Though in a different degree, manner and mode, the process is the same as that occurring in a steam engine or hydraulic power plant,—namely, the

of Bombay then were using over 100,000 horse-power; and that the power plants of the Tata Hydro-Electric Power Supply Company are designed to yield 100,000 horse-power in their full development; also that the Bombay mills alone then numbered 44 and were using 53,000 horse-power.

On the foregoing assumptions, then, the potential man-power available for charkha spinning in the rural districts of India for three months of each year is about equivalent to the entire mechanical manufacturing energy consumed in Bombay in 1919, or the entire output of the fully completed Tata Hydro-Electric power plant, or approximately twice the total power than being consumed in Bombay textile mills.

Thus, we see that there is plenty of solar power in India, and that, when developed through people and charkhas, it represents a respectable amount of actually available manufacturing power. These figures are only approximate, but they reveal the realities of the situation. The absolute amount of power thus available is not as important as its distribution, method and purposes of use.

But any engineer also wants to know how efficient his proposed power establishment may be.

As to the first stage of transformation of solar energy, there is no reason to believe that the photosynthetic ability of modern food-producing plants is any less efficient than that of the plants which made the material of coal and petroleum.

As to the second stage, in Morrison and Henry's *Feeds and Feeding* (cited above), we find at page 105

minimum of transportation cost; and the market is everywhere.

To all this the reply may be made: "A very simple and pretty little theory. But the amount of energy which could be so transformed by these man-engines is so tiny when compared with that of modern power-plants and factories, and the rate of power production by hand is so slow and inefficient compared with that of modern machines, that the proposal simply falls flat."

Let us see.

CHAPTER II

ENGINEERING DETAILS

What does this solar energy really amount to ?

We will examine it in detail, not to argue that it can be fully utilized, but because we all need to correct our perspective on the problem of power in modern industry.

The article on "The Sun" in the *Encyclopedia Britannica* (11th ed.) states that the units of solar energy received per minute per square centimeter at the earth's mean distance from the sun amount to 2.1 calories, or at the rate of 1.47 kilowatts per square meter, or 1.70 horse power per square yard.

James Fairgrieve, in his *Geography and World Power* *, referring to the Sahara Desert, says, "Here, on an area comparable with that occupied by greater London, is yearly directed as much solar energy as could be produced on complete combustion by the total amount of coal annually raised in Britain."

Another author describes it has follows: † "Let us see if we can get some idea of the energy the sun ex-

* p. 355. London University Press, London, 1925. This book shows most interestingly the importance of the increasing use of physical power in the history of all nations from earliest times.

† *The Children's Treasure House*, Vol. VIII, p. 65. Edited by Arthur Mee. Educational Book Co., Ltd., London.

pend. The valley of the Mississippi is reckoned as having an area of 982,000 square miles, and on each square mile there falls every year about forty inches of rain. Now, the coal that would have to be consumed to evaporate a body of water one mile square and forty inches deep would be 182,000 tons. The coal, therefore, that would be required to evaporate the rain that falls in one year on the whole Mississippi Valley would be 178,724,000,000 tons. The output of coal for the world in a year is only a little over 1,100 million tons, so that to evaporate enough water to supply the rain of the Mississippi for a year would take 150 times the world's annual coal supply."

The solar energy falling on the area of India in one year would then be, roughly, in horse power, a number represented by 4,996 followed by fifteen cyphers. This would be equivalent to over twenty-nine thousand times the horse power obtainable in ordinary practice from all the coal mined in all the world in the year 1920.*

The current supply of energy from the sun is thus amazingly greater than anything we ordinarily realize, and vastly greater than our resources of coal and oil. *This* is the real source of the material wealth of India. We do and can use only a minute fraction of it, but to disregard available means of utilizing it is clearly unintelligent and unscientific.

"A man's work is usually from one-sixth to one-tenth of a horse-power...for a minute or two he can

* Data based on figures given in article on Coal in *Encyclopædia Britannica*, 12th ed., and in W. N. Polokov, *Mastering Power Production*, McGraw-Hill, New York City, 1921.

exert a full horse-power or even more." For the moment we will disregard the question of what part of that power would be utilized in a charkha. Remember that the technical engineering term "horse-power" is not actually the power of a horse, but a unit rate of work in terms of foot-pounds and time.

From the Indian Census of 1921 we learn that in British India and the Indian States, exclusive of the North West Frontier Province, Kashmir, Burma and the Andaman and Nicobar Islands, there were then 104,943,712 "actual workers", both male and female, wholly engaged in "pasture and agriculture". A proportional part of the population of the North West Frontier Province and Kashmir also wholly engaged in agriculture would probably amount to at least another 2,000,000—making a total for continental India, exclusive of Burma † of approximately 107,000,000.

Taking a man's work as the lower of the two rates given above,—one-tenth of a horse-power,—we thus have available for work in the agricultural districts the equivalent of 10,700,000 horse-power. In the entire absence of any available experimental data, but as an attempt to make a fair guess, suppose we say, for the sake of discussion, that the operation of a charkha would consume only one/one-hundredth of a man's power. This

* W. A. Henry and F.B. Morrison - *Feeds and Feeding*, 18th edn. 1923, Para. 444. Madison, Wisconsin, U.S.A. This is the leading American authority on nutrition, metabolism and energy studies of farm animals.

† Burma is omitted because the author has no information as to the extent of agricultural unemployment or under-employment there. The exclusion helps to keep the figures conservative.

estimate would give us the equivalent of 107,000 horse-power available for charkha yarn production in the agricultural districts alone.

Furthermore, it is actually available all day long for at least three months of the year, and for part of the day all the rest of the year. In the opinions of all reliable and competent observers, both British and Indian, it is agreed that the farmers in practically every province and district in India are idle for at least three months of each year. Many authorities say four months and some six. These various authorities also agree that even on the days when the farmer is working, there are idle hours to a considerable amount. This tremendous unemployment, so wide spread and so regularly occurring every year, is an exceedingly important factor in the Indian economic situation. It is so different from Western conditions that we have thought it wise to quote the authorities fairly extensively. These quotations will be found in Appendix B.

From this it is clear that the potential available man-power for charkha work is very large.

How large it is compared with other power sources may be judged from the following figures. According to the *Indian Year Book* for 1924 * (p. 285), a preliminary report made in September, 1919, to the Indian Industrial Commission by Mr. J. W. Mears, M. I. C. E., Electrical Adviser to the Government of India, stated that the industries of all India then absorbed something over a million horse-power. The same issue of that Year Book (pp. 285-6) also states that the mills and factories

* Bennett, Coleman & Co., Ltd. *Times of India*, Bombay.

of Bombay then were using over 100,000 horse-power; and that the power plants of the Tata Hydro-Electric Power Supply Company are designed to yield 100,000 horse-power in their full development; also that the Bombay mills alone then numbered 44 and were using 53,000 horse-power.

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a paragraph on "The Animal as a Machine." It says in part:

"When a horse is working at full capacity during the day, it will convert about 8 per cent or more of the gross energy of its feed into actual useful external work, such as handling a load, without counting the energy expended in work of moving its own body. If credit is also given for this work of locomotion of the body, the percentage efficiency is 15 per cent or more.

"Compared with these estimates of the efficiency of animals as machines, it was found in recent tests of 65 different farm tractors at the University of Nebraska that on the average the tractors converted 8.0 per cent of the gross energy of the fuel (chiefly kerosene) into work of draft, which did not include the work of locomotion of the tractor itself. In developing belt power, where there was no locomotion, the tractors on the average turned 13.4 per cent of the gross energy of their fuel into work performed. This may be compared to the efficiency of 15 per cent or more for the horse, when credit is included for the work of moving the body. Thus, as a mere machine, the animal compares favourably with the best modern tractors."

As regards man himself, Prof. J. G. McKendrick in his *Principles of Physiology* * states that man can change 25 per cent of his food energy into mechanical motion, the remainder going to heat, diges-

* Home University Library, Williams and Norgate, London.

tion and body maintenance. Also that the best reciprocating steam engine can transform easily about 12½ per cent of the energy of the coal.

Prof. Frederick Soddy of Oxford University, F. R. S., and Nobel Prize winner in Chemistry, 1923, says:

"As a working mechanism, a man may be highly efficient from the point of view of the part of the energy value of his food that appears as work. This sometimes exceeds 30 per cent, and the very best steam engines rarely approach this efficiency." *

Thus, the food-man combination seems to be as physically efficient as the coal-steam engine method of securing mechanical power.

Indeed, the food-man-charkha combination is actually more efficient than the coal-steam-engine-textile-mill when the total consumption of solar energy units is considered. For before the charkha or power-spindle can start operation, the respective machines must be made. The amount of solar energy units represented by the coal required to manufacture the metal power-driven spinning machine from beginning to end and the boilers and engines required to run it is vastly greater than that represented by the manufacture of the wooden charkha. This difference is further enhanced by comparing the energy used in manufacturing the metal power-driven balers, ginners, openers, breakers, carders, slubbers, rovers, warpers and looms with that used in making the hand-gin, hand carding bow and

* See his *Wealth, Virtual Wealth and Debt*—Allen and Unwin, London, 1926, P. 51-52.

hand loom. This difference in favour of the hand implements is great even when reduced to terms of individual spindles and looms, or to units of yarn or cloth produced. Furthermore, even this difference does not take into account the titanic quantities of energy used up in the pressure of the earth on the coal, and the various subterranean stresses for millions of years.

The Westerner may be inclined to dismiss such elements of comparative efficiency as silly, and to say that it is only the comparisons of human labour which should count. But the more advanced engineers are now seriously considering all material elements of waste and inefficiency. The East is accustomed to long-time views, and to Orientals and to those who think of the factors of stability of a whole civilization, such considerations as these may not seem futile or nonsensical. The Western claim to greater efficiency of machinery over hand implements can be maintained only by disregarding a considerable part of the required transformation of solar into chemical and mechanical energy.

From an engineering point of view there is no sense in having a power or machine establishment much more powerful than is needed to produce the quantity of goods which the market may reasonably be expected to absorb, allowing for probable growth. Too much machinery means idle equipment and consequent great overhead expense and loss.

From the discussion in Chapter IV it seems clear that the Indian market for cloth will not soon largely increase. And possibly it would be a mistake for Indian mill owners to expect that they can enter many more

foreign markets with their products and compete with the mills of other nations. If this is so, there is little room for expansion of Indian cotton mills. But to the extent that khaddar can utilize existing solar power more cheaply than the mills, there *is* room and need for the increase of charkhas and hand looms.

If then, the rates of production of the charkha and hand-loom are or soon will be more closely adapted to the actual effective demand of Indian farmers and villagers and to the rate at which they wear out their clothing, and if they can utilize existing solar energy more cheaply than the mills, then from an engineering and strictly economic standpoint they are more efficient than the mills. The fact that a small group of people can make money profit out of mills should not blind us to the further fact than the losses to the nation from wasted man-power and sun-power in the existing situation may more than offset any gains by the small group.

To carry on the argument, not only are the "man-engines" present, but there are also great numbers of charkhas and hand-looms not in full use. It is reliably estimated that there are already in India 5,000,000 charkhas. The Census of 1921 showed 1,938,178 hand-looms, exclusive of Berar, the Central and United Provinces. Many of these spindles and looms are now idle, but they could easily be refurbished. Furthermore, a new charkha costs only from 2½ to 5 rupees, depending on the style and place of manufacture; and a new hand-loom costs only about Rs. 20. Both can easily be made by village carpenters without special instructions.

Against these costs of hand appliances we may set

the cost of setting up a modern yarn mill of say 20,000 spindles in India, according to the estimates in the *Indian Textile Journal* * namely 1,660,917 rupees. This sum, if invested in charkhas at Rs. 5 each, would provide 332,183 hand-spindles, instead of 20,000 mill spindles, and the production of yarn would be at least 11 times greater than that from the mill.

Another interesting comparison of costs is given at page 202, of *Hand Spinning and Hand Weaving* (above cited), on a slightly larger estimate of costs. We reproduce it here.

	Mill power	Hand power
Hours of work in one year	2,920	2,920
Output per spindle	100 to 120 lbs	90 lbs
Count of yarn	15	15
Cost of spindle	Rs. 100	Rs. 3 to 4
Percentage of spindle efficiency relative to costs	100	2,400
Out-turn per loom	12,000 yds.	1,200 yds
Cost of loom	Rs. 900	Rs. 20
Per centage of loom efficiency relative to costs	100	450

As to repair and maintenance costs, they would obviously be almost nil in the case of the hand implements, and all repairs of such a nature as could easily be made by the village carpenters or blacksmiths. Not so with mill repairs and maintenance. Also charges for depreciation, obsolescence and insurance on mill machinery

* Reproduced in *Young India*, Sept. 3, 1925, in article called 'Mills vs. the Spinning Wheel'.

are, of course, vastly greater than of those for hand appliances, if the latter can be said to exist at all.

Another detail. To make any appreciable addition to the mills of India would require loans of foreign capital. For a nation whose people are as poor as Indians, would such a policy be wise? Let us again consult Mr. Ford. In his book *My Life and Work*, at pages 157 to 176, he says in part:

"We are not against borrowing money and we are not against bankers. We are against trying to make borrowed money take the place of work.....

"Borrowing may easily become an excuse for not boring into the trouble.....

"The time for a business man to borrow money, if ever, is when he does not need it. That is, when he does not need it as a substitute for the things he ought himself to do. If a man's business is in excellent condition and in need of expansion, it is comparatively safe to borrow.....

"I have no prejudice against proper borrowing. It is merely that I do not want to run the danger of having the control of the business and hence the particular idea of service to which I am devoted taken into other hands.".....

"I cannot too greatly emphasize that the very worst time to borrow money is when the banking people think that you need money.....

"You will note that the financiers proposed to cure by lending money and not by bettering methods. They did not suggest putting in an engineer; they wanted to put in a treasurer.

"And that is the danger of having bankers in business. They think solely in terms of money. They think of a factory as making money, not goods. They want to watch the money, not the efficiency of production."

In his *Today and Tomorrow* (pp. 32-33), he says:

"Another rock on which business breaks is debt. Debt is nowadays an industry.....

"When business goes into debt it owes a divided allegiance. The scavengers of finance, when they wish to put a business out of the running or secure it for themselves, always begin with the debt method. Once on that road, the business has two masters to serve, the public and the speculative financier. It will scrimp the one to serve the other, and the public will be hurt, for debt leaves no choice of allegiance.

"Business has freed itself from domineering finance by keeping within itself its earnings."

One among Mr. Ford's principles of management of a railroad which his company owns and operates is that "we have made all our improvements with our own money." He built up his own business from small beginnings without borrowing.

In conclusion, it may be said that perhaps India may some day follow the other nations in the extensive use of oil and coal and water power. But to do so really efficiently and in such a way as to serve *all* her people and all the world, not merely a small group of owners and financiers,—will require much thought and a careful period of discipline. And whether the future will be

that regime or one without much machinery, the wisest next step for the immediate future is the fullest possible use of her sun energy through the charkha and hand-loom. Improved agriculture will come later. That will be considered in Chapter XI. Through the charkha and hand-loom India can once more regain a healthy balance between agriculture and industry, such as existed about 175 years ago, and she can do this without slums or any of the other difficulties and evils involved in big cities. Engineering considerations seem thus to rank the production of khaddar as of greater immediate importance than possible improvements in agriculture. In the light of all these considerations, Mr. Gandhi seems to be, in effect, a great industrial engineer.

CHAPTER III

COMPETITION BETWEEN MILL CLOTH AND KHADDAR

In spite of the foregoing considerations, there is the fact of competition. How does it stand?

At first sight, the suggestion that Khaddar could in any way compete with mill cloth seems almost ridiculous. The productive superiority of modern steam or electric power driven mill machinery over the little hand operated charkhas and looms is so enormous.

For example, Bulletin 79 of the National Association of Cotton Manufacturers (U. S. A.), dated Nov. 15, 1926, on "Progress in Cotton Manufacturing", gives us the following figures for the year 1925, from New England cotton mills:

Output in one hour	
Pounds per spindle	7076*
Pounds per loom	201
Yards woven per loom per day of 11 hours	5704

TABLE I.
(portion for 1925 only)
MAN-HOUR PRODUCTION

Unit of Measurement	Units of Cloths produced per man-hour
Straight pounds	{ 7.53 (sheeting)
	{ 8.94 (flannel)
	{ 7.83 (both)

*Average of all counts

TABLE I. (*continued*)

Unit of Measurement	Units of Cloths produced per man-hour
Pounds based on "D" grade product reduced to picks. }	{ 8'12 (sheeting) 4'36 (flannel)
Product reduced to 36-inch picks }	{ 8'31 (sheeting) 4'04 (flannel)

These figures as to "straight pounds", when transformed into statistical terms of spinning, show that in a modern American cotton mill the labour of one person in one hour is able to make approximately 135,000 yards of number 20s yarn, starting with lint cotton and weaving it into cloth. Doubtless, figures for English mills, if available, would show equally high production.

By comparison, so far as the figures are comparable, we find in Mr. Gandhi's paper, *Young India*, for May 5, 1927 a report of a high record in hand-spinning for twenty-four consecutive hours during the celebration of National Week at the Satyagraha Ashram at Sabarmati. The record established then was made by the young man who also won the contest against all comers at the National Congress at Cawnpore during the winter of 1925-26.

The best four of the young men at Sabarmati made the following records :

	Total yards	Average per hour	Hours spun
(1)	14,784	641	23
(2)	12,889	536	24
(3)	10,933	475	23
(4)	5,761	523	11

The top man for the first 12 hours maintained an average speed of 665 yards per hour *. The size of the yarn in these four cases ranged from 13 to 15 count, the strength from 57 to 70 per cent, and evenness from 79 to 93 per cent, according to the testing standards of the All-India Spinners Association. Taking number 14 as average count, the weight of yarn spun on the charkha (641 yards) in one hour would be .655 pounds, according to data given in a "Self-spinners Table" in *Young India*, April, 1927.

During the same week one lady at Sabarmati spun 5,333 yards in thirteen hours, at a rate of 408 yards per hour, the yarn being of 26 count, 85% strength and 84% evenness.

In a district called Tiruchengodu the peasant women spin 12 count yarn at the rate of 500 yards per hour.

The rate of the average spinner, however, may safely be set at about 350 yards per hour, and the

*Since then, at the Madras Khadi Exhibition this man in two hours spun 1,400 yards of 21 count yarn of 87% uniformity and 74% strength.

average count spun in most rural districts is probably from 12s to 15s,—a distinctly coarse yarn.

The foregoing Indian and American figures are not strictly comparable as the American figures include all yarn counts. Yet the comparison has at least rough validity.

It appears, then, that a mill can produce *per man-hour* about 203 times more yarn than the charkha, when the latter is operated with greatest skill, and 236 times more when the charkha is operated with ordinary skill. And in terms of production *per spindle per hour*, the figures are .076 pounds for the mill and .055 for the high-speed charkha. For this second comparison, it would be fairer to take the average spinner's rate, say 350 yards per hour. This would give us an hourly production of .076 pounds for the mill spindle against .030 pounds for the average charkha spindle. That is to say, a mill spindle in one hour produces about two and one-half times more than a charkha spindle. For 20 count yarn, an Indian mill spindle can produce probably twice as much per hour as the charkha spindle.* This gives us a comparison of spinning production.

Data as to comparative loom output are not so readily available to us. The above-cited American report gives the following figures for the year 1925 (average yarn count not stated).

Output in pounds per loom per hour	2.01
Yards woven per loom per day of 11 hours	57.04

* *Hand Spinning and Handweaving* by S. V. Puntambekar and N.S. Varadachari, All India Spinners Assoc., Ahmedabad, 1926, p. 201.

Cloth produced per man-hour (lbs.)	7.83
Yards woven per loom per hour	5.18

One reliable estimate, furnished to us placed the output of a hand-loom at one yard (30 inches wide) per hour, using coarse yarn (count not specified). On a man-hour yardage basis the figures indicate that the mill loom produces nearly 20 times more than the hand-loom. The above-cited essay, *Hand-spinning and Hand-weaving*, at p. 212, states that using 15 count yarn, the mill loom produces 10 times more than the hand-loom. It does not give comparative man-hour figures.

These figures may be summarized thus: Mill production excels hand production approximately by the following number of times:

	per machine (spindle or loom.)	per man-hour
Spinning	2 to 2½	203 to 286
Weaving	5 to 10	20

Before considering comparative prices of hand and mill made cloth, it should be realized that, irrespective of productive efficiencies or of prices, there are certain kinds and grades of cloth in which the mill does not and cannot successfully compete with the hand-loom. The report of the Indian Industrial Commission, 1919,* at pages 10 and 11, states that the tenacity of the hand-loom is attributable in part to "the great number of types of cloth of which slow moving Indian custom decrees the use; to the fact that the demand for many

* Cmd. 51 of 1919, Royal Stationery Office, London. Also from Indian Government Central Publication Branch, Calcutta.

of these is on a small scale, while the types themselves are so special as to render it difficult for the power loom to produce them at a profit." -

On this point Mr. Amalsad, Textile Expert to the Government of Madras, says:

"There has been no relaxation of the deep-rooted belief amongst the poorest classes in this Presidency that hand-woven products possess greater durability than mill-made cloth. Hence it is that in out-of-the-way rural tracts throughout the Presidency a very large number of hand-looms are engaged in producing cloth from coarse and medium counts of mill-made yarns.....Similarly there the fine and superfine qualities regularly worn by men and women of the upper and middle classes for use on festival and marriage occasions in spite of their being costlier than mill products. Besides there are coloured saris and suiting cloths which the hand-loom weavers produce in great varieties, accustomed as they are to the economical preparation of short lengths of warp by the indigenous method. Then we may have the artistic and elaborately figured garments, chiefly worn by Hindu women of the higher castes, solid bordered fabrics and a variety of other fancy designs which do not lend themselves to production on the ordinary types of power-looms. . . . Further, this Presidency has been singularly lucky in developing and retaining a

* In accord see p. 274 of Decennial Report on Moral and Material Progress in India, cited on p. 155 of V. G. Kale's *Indian Economics*, 1924 ed., Poona City.

comparatively large export trade, amounting annually to nearly 20 lakhs of rupees, in coloured goods known commercially as Madras handkerchiefs and lungis. Special vegetable dyes are employed to obtain the effect of yarns bleeding, i.e., tinting the grey weft with the dyed warp during weaving. There are more than 12,000 looms engaged in this class of goods alone in the east coast districts of this Presidency.

"It would be seen, therefore, that the chances of the power-loom extinguishing the hand-loom are yet very remote, and disparity in prices and the ingrained custom and fashion of the people are the bulwarks of the hand weaver which the mill goods will, if at all, take a long time to demolish." *

In this connection it should be stated that a fair number of these weavers use hand-spun yarn, as Mr. Amalsad admits elsewhere in his pamphlet.

A detailed comparison in terms of price is more difficult to obtain. Careful estimates show † that if a rural worker in a cotton raising district stocks her own cotton and does her own ginning and carding and spinning and thus has only weaver's charges to pay, she will get her cloth much cheaper than the mill can make it. On the other hand, a person who does none of the

* D. M. Amalsad, *Hand-loom Weaving in the Madras Presidency* Superintendent Government Press, Madras, 1925, pp. 2,3. In accord see R. D. Bell, *Notes on the Indian Textile Industry with Special Reference to Hand Weaving* 1926. Superintendent of Government Printing and Stationery, Bombay.

† See "Charkha as the only Cottage Industry", *Young India* Oct., 28, 1926.

manufacturing work and simply buys his cloth in a city market may have to pay twice as much for khaddar as for mill cloth. The variety of prices and grades of cloth is so great that it will not help us to recite them.

In order to estimate truly the possibilities of competition we must first analyze the Indian cloth market.

First, we may distinguish seven kinds of terms of purchase or cost.

- (a) Where the rural worker stocks her own cotton, gins, cards and spins it herself and pays only weaver's charges.
- (b) Where she buys raw cotton, does her own ginning, carding and spinning and pays weaver's charges.
- (c) Where she buys ginned cotton and does her own carding and spinning and pays weaver's charges.
- (d) Where she buys from a local pinjar (carder) cotton all prepared for spinning, spins it and pays for the weaving.
- (e) Where a villager, doing none of the manufacturing work, buys direct from the village weaver.
- (f) Where anyone buys cloth from a shop maintained by a local or provincial khaddar organization, selling only khaddar.
- (g) Where anyone buys from a general cloth merchant in a village, town or city.

In this last case the cloth may be either khaddar or mill cloth. In case (e) the cloth may be made of mill

yarn, though woven on a hand loom. This last is often called "half khaddar" or "spurious khaddar".

The cost elements in these cases differ from one another. The resultant cost to the buyer is least in case (a) and most in case (g), if the cloth is genuine khaddar. In case (a) the cost of khaddar per yard is considerably less than that of any corresponding quality of mill cloth. There the mill cloth does not compete.

The number of people in group (a) is unknown. There are, however, in groups (a) to (e) inclusive probably at least ninety million people, as indicated by various estimates and Governmental censuses of charkhas and hand-looms and figures of production of hand-looms. In the year 1924-25, out of the total estimated Indian cloth consumption of 4,930 million yards, 28 per cent, or 1,380 million yards was made on hand looms from mill yarn. This percentage was maintained for the four years from 1922 to 1926.* Twenty-eight per cent of the total Indian population (316,000,00 in 1921) would be 88,480,000.

As a result of the efforts of Mr. Gandhi and his followers the number of people in groups (a) to (e) is slowly but steadily increasing. Certain Provincial Governments are also encouraging the use of hand-looms, though without great success. They urge the use of mill yarn, which Mr. Gandhi opposes. The ultimate aim of the Gandhi movement is to get a

*See Memorandum on Cotton, International Economic Conference, League of Nations, Geneva, May, 1927; Constable, London. Cf. also A. C. Coubrough, C.B.E.—*Notes on Indian Piece Goods Trade*, No. 16 of Bulletins of Indian Industries and Labour, 1921,—Supt. of Govt. Printing, Central Publication Branch, Calcutta.

large enough number into group (a) to provide yarn for the entire rural population and as much of the city folk as desire it. Inasmuch as the Indian census for 1921 shows that approximately 266,029,000 or 90.5% out of the total population live in villages or rural areas, and since cotton is or can be grown in almost every province of India, there are at least possibilities that khaddar may displace mill cloth. Other factors entering into the situation will be discussed later.

A second step in the analysis of the cloth market will be a consideration of kinds of consumers. This grouping might be as follows:

(1) The farmers and their dependents, who are idle at least three months of the year. If they spin only four to eight hours a day during their idle time, they cannot only provide yarn enough for their own clothing but also earn enough more thereby to reduce the net cost of their clothing needs to much less than the cost of a corresponding amount of mill cloth. The number of this group is potentially that of the "total supported by pasture and agriculture" as given in the census, less agricultural rentiers, amounting to approximately 218,000,000. For immediate practical purposes, however, the number is much smaller. It may be roughly indicated by the number of charkhas now in existence. The 1921 census found 1,938,178 charkhas exclusive of Berar, the Central and United provinces. Reliable estimates put the number at probably five million for the entire country. Assuming that only one fifth of these are in use, and allowing four persons in each household possessing a charkha, we may set the number

of consumers of khaddar in this group at 4,000,000. Of course a great many of these, out of sheer conservatism, were spinning and weaving and wearing khaddar even before Mr. Gandhi began his propaganda. A check on this estimate is found in the census of India, 1921. It reports 4,030,674 "actual workers" in textile industries, but only 622,198 engaged in all the cotton, woollen and jute mills combined. The difference, 3,408,476, would presumably be made up of spinners, carders, spinners, and weavers using hand implements, together with perhaps 85,000 workers in power ginning mills. The "total supported" by textile industries that year was reported as 7,847,829.

(2) Those who, though not farmers, are believers in the khaddar movement and buy khaddar even though they may have to pay more for it than for mill cloth. Many of these, though not all, are "voluntary spinners". This group numbers only a few thousands. Their significance in the competitive situation lies not in their numbers but in their influence. They are active propagandists and workers and real leaders. They are causing a steady increase in group (1).

(3) Those who buy cloth made on hand-loom from mill yarn. As we have already learned, these number about 88,000,000. They mostly live in villages. As the quality of charkha yarn improves, and if the price of mill yarn increases, their will be transfers from this group to group (1).

(4) Those who prefer to buy mill cloth. These do so mostly because they find it cheaper or lighter, but a few also are convinced that to do so is sound economic

policy. Most city-dwellers, that is, 10% of the population, are in this group, and also many millions of rural residents. None of this group do any spinning or other parts of cloth manufacture.

So much for the analysis of the cloth market. It has perhaps helped to reveal some of the possibilities of consumption of khaddar.

Now let us consider again one of the comparative production factors of the competition.

We have seen that the mill spindle is, for the grades of yarn entering into the great bulk of cloth used in India,* from two to two and one-half times more productive per hour than the charkha spindle. The mill loom is from five to ten times more productive than the hand-loom.

Although the man-hour comparisons are much more in favour of mill machinery, they should be disregarded in this connection because the enormous number of unemployed or under-employed people in India makes the idea of "labour saving" entirely irrelevant to this part of the discussion. India does not at present need to "save labour," but instead must find work for it. She may want to "save *time*" for certain of those who work, provided that thereby their wages may be increased and the time so saved be put to other uses profitable to the country, and provided that thereby no further idleness of other people be created. As has been seen, the num-

* In 1925-26, out of a total of 684 million pounds of yarn made in Indian mills, 444.7 million pounds were of 1 to 20s count, and 213.8 million pounds of 21 to 30s count. The farmers are too poor to buy fine cloth, and they form the bulk of the population.

ber of rural workers in India unemployed for three months of each year is equivalent to 26,750,000 idle for an entire year. Owing to the widespread survival of some skill in hand-spinning and the relatively short time needed to learn the art, these are practically all potential spinners. For them, working at home, even the tiniest wage is better than nothing. They have vastly more "man-hours" ready to be utilized than can be saved by any mill machinery. This army of unemployed is over 282 times the entire cotton mill working population of the United States, according to the 1920 census of that country. Hence, the fact that, measured in man-hours, United States mill spindles are 286 times more productive than charkhas seems beside the point. There is a surplus of "man-hours" already in India. Let her therefore save something else of which she has less surplus and for which she has need.

The ultimate object of all economic activity is the actual completed supply of food, clothing and shelter and other needs of mankind to all the ultimate consumers. In estimating the relative efficiency of two different forms of economic activity, our units of measurement must be somehow correlated with or corrected by considerations of that ultimate object. Otherwise our results will not be valid in the realm of *economics*, though perhaps quite satisfactory for *mechanics*. Without attempting now a further analysis of this point, it may perhaps be said that in this special case under consideration the implement-hour or machine-hour is a more accurate or adequate unit measurement of economic efficiency of production than the man-hour

unit. The man-hour is too purely mechanical, too slightly connected with ultimate consumption. The implement-hour seems to contain implicit in itself a larger number of factors of place, time and circumstance which tend to correlate it with the actual utilization of product by the ultimate consumers.

Another way in which unemployment bears on competitive prices is set forth in the chapter on Unemployment. The comparative wearing qualities of khaddar and mill cloth and the effect of that upon their competition is considered in the chapter entitled "Some Cotton Technology." Whether spinning yields or can yield a sufficient wage to enable it to compete with other occupations will be considered in Chapters VIII and X. How competition between khaddar and mill cloth may affect the mill interests of Bombay, Japan and Lancashire is discussed in Chapter X.

CHAPTER IV
FACTORS TENDING TO
DECREASE COMPETITION

If the efficiency of the charkha could be increased only two and a half times, it would stand even with the mill spindle; and if the efficiency of the hand-loom could be increased tenfold, it, too, would be on an even footing with the mill loom.

Experiments for this purpose are now being carried on both by the All India Spinners' Association and by many provincial Khaddar organizations and private inventors. There is a strong probability that within the next three years the efficiency of the charkha will be doubled or trebled. Mechanically, the problem is not very complex. Three spindles, instead of one, operated at the same time by one person, would solve the mechanics of the thing. But to contrive at the same time to maintain the variable discrimination and control of the spinner over each thread is more difficult. Improvement of preparatory processes will greatly assist. Multiplying the efficiency of the hand-loom by two can probably be accomplished, but so great an increase as ten times seems unlikely. This can be remedied, however, by developing a larger number of weavers from the existing idle population.

Of course there may be further improvements in mill production, too. But probably they will be much

slighter. A vast amount of thought and ingenuity has already been expended on this aim. The American bulletin referred to in Chapter III states that "in the last 75 years the production per man has increased practically seven times". It also shows that in that period the output in pounds both per spindle and per loom in one hour has not quite doubled. This indicates that perhaps for certain counts the charkha is now about as efficient on that basis as the power spindle was 75 years ago.

Even in the last six years there have been marked improvements in the quantity of production of hand implements. For instance, at Sabarmati Ashram during January, 1926, by careful study of better ways of spinning, the average output of the members was increased 10% in one week. Increases in speed have been obtained in practically all spinning centres.

So far as competition between mill cloth and khaddar may be decreased by improvements in the quality of the latter, the reader is referred to Chapter IX.

There are several factors which tend to detract from the competitive advantage hitherto enjoyed by mill cloth.

First of all, if production of cloth is intended for consumption only in the country where it is produced (as is the case with khaddar), it is not quite so important that it be done at high speed as it would be if it were intended for sale in the open markets of other countries. This is even more true where the cloth is for consumption by one's own family or fellow villagers. This is definitely the aim of the khaddar movement,—

manufacturing primarily for the needs of one's own family, and sale only in case of a surplus.

In the scheme of village economy which prevails for 90% of the population of India, both production and distribution are decentralized and on a small scale, for the most part. The market of a village weaver is very small compared with that of textile mill. In that market he could not possibly sell all his product if it were as great as that of the mill. Nor does he want to be idle. That is to say, the rate of production of hand weaving is well adapted to the size of the market and the needs of the producer.* The same is true of hand-spinning, whether it is merely to provide for one's own clothing or also for purposes of sale of yarn. For the latter purpose a considerable increase in charkha efficiency would greatly help, but even there, too great an increase might prove to be more of an evil than a benefit.

It may be compared, as Mr. Gandhi says, with family cooking. No doubt a modern bakery can produce vastly more bread and cakes per oven or per man-hour than the individual house-wife. A factory can turn out much more jam and preserve than any household. A restaurant can prepare greater quantities of meals than the home cook. But domestic production is closely adapted to the number of its consumers and to their qualitative needs and desires and tastes. So, although bakeries, restaurants and food factories exist and have their place in city life, they can scarcely be said to compete

* Cf. R. Austin Freeman - *Social Decay and Regeneration*, Constable, London, 1921.

with the house-wife in village and rural life, especially in India.

Or again, take the growing and preserving of vegetables and fruits from the home garden for home use or for sale in a local village market. No doubt the huge commercial market gardens and tinning or preserving factories can do this work more cheaply, uniformly, rapidly and on a larger scale. Yet the small-scale, localized product persists and finds a market, because it is adapted to the needs and tastes of a certain part of the consuming public. The two products do not really compete. They exist side by side and supplement one another. So, also, to a certain extent, khaddar and mill cloth.

The importance of the price factor in competition between khaddar and mill cloth may decrease for another reason. The situation may become analogous to that of the American and British cinema films in the British Empire. British film producers and an active part of the British "consuming" public dislike American films for various reasons and desire to oust them. It is not clear that British films are cheaper. But it is quite possible that a sufficiently strong public sentiment may be created in favour of British films to practically exclude American films from Great Britain.

That is to say, prices are not the sole criterion for estimating what goods will find a market. Sentiment, taste, conformity with tradition, custom or fashion often prevail over cheaper prices. * Whether such a senti-

* For example, in regard to cloth, see D. M. Amalsad—*Handloom Weaving in Madras Presidency*, 1925, Superintendent, Government Press, Madras.

ment will finally prevail in the Indian cloth market in favour of khaddar we cannot yet say, but it is within the realm of possibilities and of "practical economics".

But even if hand devices do not reach the productive rate of power-driven machinery, there are numerous savings in costs under a small scale, decentralized scheme of production and distribution such as has prevailed throughout the Orient and largely accounts for the low cost of living there. The khaddar programme would tend to take full advantage of these savings, better probably than any other economic arrangement could do. The kind and extent of these savings will be discussed in Chapter VI. It seems likely that these savings are great enough to offset very largely any relative slowness of production that may remain with the hand implements after their improvement.

We may say that the efficiency of the power machine lies in its speed and uniformity and exactness of product, but that, in its present connection with capitalism, its inefficiency lies in its large overhead costs, tendency to urbanisation, and apparently inevitable accompanying unemployment. At present America is avoiding two of these inefficiencies partly by increasing the consumptive power of her people through high wages, and partly because she is steadily increasing her use of power, made possible because her fuel costs have not yet begun to rise. At present other nations either will not or cannot find these two avenues of escape from the difficulties.

Let us now consider certain aspects of competitive prices.

First of all, as above noted, for a large and increasing group of people, owing to their situation and work, the cost of khaddar is distinctly below that of mill cloth.

Secondly, it seems clear that the price of khaddar will tend to decrease and that of mill cloth to increase; or at least, khaddar prices will decrease faster than mill cloth prices.* The reasons for this are several. There are much greater probabilities of improving the quality and quantity of production of all the hand implements in the near future than of improving that of power machines. Any such improvements will decrease khaddar prices and also increase the amount of khaddar on the market as a result of attracting more spinners and weavers to the work. Wage increases in cottage industries are less and not so rapid as in textile mills. The worker has his whole family to help him.

Furthermore, the enormous demands of industry and transportation in all the Western nations are rapidly using up (except in the United States) easily accessible coal and oil supplies, and thereby increasing the cost of fuel. † "Absolute exhaustion is less to be expected

* Khaddar has actually decreased in price per yard as follows: In Andhra, for 36" cloth, 1922 price 8 As., 1926, 6 As., In Bengal, 4 yds. x 44", 1922 price Rs. 2-12-0, 1926 Rs. 2-0-0; In Punjab, for 27" cloth, 1923 price Rs. 0-6-9, 1926 Rs. 0-5-3; In Tamil Nad, for 50" cloth 1922 price 13 As. 1926 price 9 As. 9 p. See Report of All India Spinners' Association, 1925-26. Also still further reductions noted in the 1927 *Khadi Guide*, also published by the All-India Spinners' Association, Mirzapur, Ahmedabad.

† *Mineral Resources for Future Populations*. by F. G. Tryon and L. Mann, of Division of Mineral Resources, U. S. Geological Survey; being Chap. VIII of *Population Problems*, edited by L. I. Dublin, Houghton Mifflin & Co., Boston (U.S.A.) 1926, pp. 131 to 137, 118, 119.

than increased cost of recovery. Increasing cost is the ultimate fate of all mining enterprise."..... "Very clearly, also, however remote the day of absolute exhaustion may seem, the day of rising costs in many branches of mining is not far away..... The evidence shows that Europe is approaching the actual point of increasing costs energy, if indeed she has not passed it."* In England and Wales, since 1883, there has been a gradual increase in the cost of mining coal. In Europe the output of coal has been practically stationary for some years.† Possibly a study of the comparative costs of fuel in Great Britain and Japan might partly explain the ability of Japanese cloth to displace British cloth on the Indian market. In modern industry, as Mr. Henry Ford, the American automobile manufacturer, says, ‡ "The cost of power and transportation is controlling." Or to put the matter in a nutshell, "A decrease (in the cost of fuel energy) tends to accelerate the substitution of machinery for hand labour; an increase has the opposite effect." §

A further element tending to decrease competition from mill cloth is the low purchasing power of the Indian rural population. This is clearly expressed in an article entitled "Britain's Population Problem" by Prof. Warren S. Thompson, in the "*Economic Journal*" (London) for June, 1926. Speaking of India, he says (p. 182):

"There seems to be an increase in the propor-

*Ibid.

† Ibid, p. 135

‡ *Today and Tomorrow*, Heinemann, London, 1926, p. 110.

§ *Population Problems*, Ch. VII, above cited, p. 125.

tion of the population engaged in agriculture in recent years. Paradoxical as this may seem, this increase in agricultural workers is a direct result of increasing industrialization. The non-agricultural village population thrown out of work by the adoption of factory methods of production has no choice but starvation or work on the land. Custom and poverty both render the capacity of the people to absorb machine made products less than could be supplied if the workers accustomed to supply the manufactured goods by hand labour were all put to work on machines. Consequently it would appear probable that the increasing industrialization of India will be accompanied for some time by an increase in the proportion of the population engaged in agriculture. That modern factory production is growing in India admits of no doubt, although its growth is slow as compared with that of Canada or Australia. The fact that such industries as there are, are organized in the customary capitalistic fashion, means that they do very little to increase the consumptive power of the workers, and besides that they give rise to a serious unemployment problem, thus decreasing the consumption power of those unemployed. Furthermore, by driving more people into agriculture they probably tend to diminish the individual consumption power of the agricultural population which is close to three-fourths of the whole. Indeed, if only a small increase in the proportion of the population engaged in agriculture were to take place, it might so

reduce the productive power of the people as individuals that imports would decline rather than increase. We should realize, too, that India's capacity to absorb imports is very small—generally it is less than four dollars per capita per year—and that it needs but little increase of the pressure of numbers on agricultural resources to reduce even this small capacity. In view of this general situation in India it seems that she is not likely to be in a position to increase her imports to any great extent in the near future, if, indeed, the decline of recent years may not be of permanent nature."

Thus, the low purchasing power of India acts like a customs tariff wall to reduce imports of foreign cloth.

In this connection we should note that the cost of manufacture of mill cloth in 1924 was double that in 1914.*

It might almost seem, indeed, as if the low purchasing power and enormous unemployment of India are acting like jiu-jitsu to overthrow competition of foreign cloth against khaddar. The very productive weakness of India may slowly tend to exclude foreign mill cloth.

Consideration of the various savings obtainable by small-scale, decentralized production and of the existing but decreasing excess cost of khaddar over mill cloth suggests that the situation may be analogous to the high initial cost of installation of a large new machine in a factory. As soon as it once gets well under way,

* *Young India*, Oct. 28, 1926, P. 398. Also memo on Cotton, for International Ec. Conference, Geneva 1927, above cited pp. 28-32.

its greater efficiency results in considerable reduction in costs. But if the whole first cost of installation has to be applied to its first product, and cannot be spread over a considerable future period, it might seem at first as if the installation was a mistake. So, it seems probable that the present high price of khaddar is largely due to difficulties of initial organization and development, and that once these are straightened out, the savings will become effective and the price in comparison with mill cloth will considerably decrease.

Still another element in the situation is but slightly realized anywhere. It lies in the fact that modern capitalistic machine industry can be secure and succeed only by constant expansion. It cannot simply mark time or hold its own. Unless it steadily expands, it is overwhelmed by high overhead costs, financial crises, stoppage of production, unemployment and other economic difficulties.* Or, to put it in other terms, there must be a constantly increasing use of fuel power.

Now since all over Europe the price of fuel is increasing, it seems probable that cloth imports from Great Britain and other European countries will gradually decrease. Whether Japanese imports will increase seems somewhat doubtful owing to pressure for wage increases there and various other internal economic and social stresses and strains. Since Britain has both a predominating economic and political control over India, it is possible that she might prevent any great expansion of Indian owned cloth mills. And the United States is so

* W. T. Foster and W. Catchings, "The Automobile, Key to Our Prosperity," in *The World's Work* (New York,) for December, 1926.

busy in developing the consumptive capacity of her own people and the South American and Chinese markets that it seems probable that she will not attempt for some years to place any considerable quantity of her cloth on the Indian market.

The actual decrease in imports of cotton piece goods from Great Britain to India as compared with 1913-14 is only a part of the general decrease of world trade in cotton goods. Each country is tending to produce more of its own cloth. India is no exception.

This is not merely the result of an increase in the use of machinery by each country. It means that all countries are now imitating the earlier industrialized countries in the idea of using more available power—either fuel, hydraulic, or man power,—and using it with less waste (i. e., more efficiently). India is not only using more fuel and hydraulic power, but also more man power,—the latter partly through the charkha and hand loom. The steady increase in both charkhas and hand-loom since before the War indicates that the hand instruments are economically efficient.

The foregoing statement of tendencies seems to be borne out by the Memorandum on Cotton, prepared for the International Economic Conference of the League of Nations, held at Geneva, May, 1927.* The figures given relate entirely to mill production. A few quotations will suffice.

(pp. 5 and 6) (Referring to consumption of cotton compared with pre-War amounts)—“It is estimated

* Constable & Co., London.

that in India, with a population of 325,000,000, the decrease may amount to 7 per cent.....Though world consumption has not decreased, world trade, especially in yarns, is smaller, and, since Great Britain for half a century was responsible for the major part of extra-European trade in cotton goods, this change has fallen most heavily on the Lancashire industry. On the other hand, India has been particularly affected by the contraction of the trade in yarn and now weaves the products of her spinning mills, thus reducing her demand for British piece goods. Under the stress of high prices during and immediately after the war, China, the other great textile market, began to supply an increasing proportion of her own needs. The reduction in total trade was accompanied by a change in the shares of the various exporting countries. While Great Britain, Poland and Germany have lost part of their markets, the United States of America, Japan and China have profited.....

"Many of these changes had begun to make themselves felt before the war; they were accelerated during the war, and some of them are likely to prove permanent in character. Countries which had difficulty in covering their requirements in Europe during the war increased and perfected their own equipment, or began to buy increasingly from Japan and the United States.....

"The decline in trade is most serious for Great Britain. In the last four years, however, the variations have been slight. The question with

which Lancashire is now struggling is how to adjust an industry with heavy capital charges to a smaller production and at the same time maintain an export trade which depends upon being able to compete in the world markets with newer industries employing cheaper labour in Eastern countries. The competition is mainly with the industries within the importing market itself.

(p. 17) "The figures.....of Indian piece goods production are those of the mills only. But the consumption of yarn by hand-loom has steadily increased.....Total Indian consumption in that year (1924-25) was reckoned at 4,930 million yards of which 36.5 per cent came from Indian mills, 35.5 per cent from imports and 28 per cent from hand-loom."

It then cites Professor Daniels' estimate of annual consumption of cotton cloth in India, including estimated hand-loom production in the period 1910-14 as 1,056 million yards and in 1932-26 as 1,226 million yards, the latter being 28.4 % of the total average annual consumption of 4,328 million yards during the latter period.

(p. 30) "The shift in the consumption of cotton and in the production of yarn and cloth for the exporting countries of Europe to the great consuming markets in Asia has carried with it a reduction of world trade in cotton goods."

(p. 32) "During 1923-5 the United Kingdom exported per annum nearly 24 per cent less yarn and 31 per cent less piece goods than during the years 1909-13. But she still remains by far the most important exporter

of manufactured cotton products, and since it is mainly the Asiatic markets which she has lost the falling-off has been in the cheaper varieties of goods, and the change in values has therefore not been commensurate with the decrease in quantity. Moreover, even in other markets, the loss appears to have been in the cheaper qualities of goods."

The Memorandum goes on to show that of the total exports of cotton piece goods from the United Kingdom the Far East took 61.6% in 1913 and only 41.8% in 1925.

Taking all the foregoing into account, it seems reasonable to suppose that competitive pressure against khaddar will gradually diminish.*

If it is said that the foregoing reasoning is a denial of the historic fact that modern machine industry practically put an end to the old Indian hand production of cloth, the answer is simply that such was not the historic fact. The hand production of cloth in India was never totally destroyed. And to the extent that it was destroyed, the destruction was not primarily due to superior efficiency of the mill machines but to British customs laws imposed for that very purpose, and to the organized, deliberate break-up of Indian manufacture and trade in India by economic and forceful pressure. From the data in Chapter III we have seen that the Indian charkha spindle is now perhaps as efficient as was the mill spindle 75 years ago. And the superior

* cf. P. P. Pillai *Economic Conditions in India*, Routledge, London, 1925, p.p. 136—157. Also V. G. Kale, *Indian Economics*, 1924, ed., Aryabhushan Press, Poona City, pp. 152-53.

skill of the Indian craftsmen and the resulting durability and fineness of Indian textiles gave them an assured large sale in England and the Continent up to 1813-14, the time of the imposition of very onerous customs duties on Indian piece goods imported into England. This was from forty to fifty years after the invention of the fly shuttle, the spinning jenny, the steam engine and the power loom. The destruction of Indian cloth manufacture and trade put an end to the discontent among British textile workers caused by unemployment and provided England with a medium of payment other than gold or silver for the food stuffs and raw materials which she wanted from India. The Indian aspect of the matter has not received full consideration. But as this book is not a history, we can merely refer the interested reader to the records.*

(1) See P.J. Thomas — *Mercantilism and the East India Trade*, P.S. King & Son, London, 1926; W. H. Moreland — *Akbar to Aurangzeb* — Macmillan, London, 1921, pp. 58—62; Bal Krishna — *Commercial Relations between India and England, 1601—1757* — Routledge, London, 1924; W. Foster — *The East India House* — John Lane, London, 1924; Dutt — *Economic History of India*, 5th ed., Kegan Paul, London, pp. 261—290; Wilson's *History of British India*, Book I, Ch. VIII; Lord Wellesley's Letter of 1804 quoted in R. Richard's — *India*, London, 1829, Vol. I, p. 84, note; F. List — *The National System of Political Economy, 1844*, trans. by S. S. Lloyd, London, 1885, p. 42; Baines — *History of Cotton Manufacture*, London: Hansard's Debates, 1813; Original records of the East India Company; Record of hearings before Parliamentary Committees in 1813 and earlier years. Brief quotations are also given in *Hand Spinning and Hand Weaving*—by S. V. Puntambekar, and N. S. Varadachari, All India Spinners' Association, Ahmedabad, and in a series of articles entitled "Shop keepers Turned Rulers" published in Mr. Gandhi's paper, *Young India* in 1927. See also some of the historians and officials cited in the long note in Chapter V.

In referring to this systematic destruction of Indian textile manufacture, no moral condemnation is necessarily intended. Bandyng harsh moral adjectives is seldom useful. All British groups, both in England and India, (and indeed most of the Western people) were then and still are entangled and blinded in the net of a commercial, industrial and financial system whose implications and results to themselves and to others we are only now beginning to understand and realize. Yet this ignorance did not and does not make the hardships any the less, nor does it constitute any reason for not trying to correct promptly any economic mistake then committed.

CHAPTER V

INCREASED PURCHASING POWER

If India desires to increase her economic prosperity, can she perhaps wisely apply some of the economic policies which have helped to make the United States the most prosperous nation in the world to-day,—with modifications suitable to Indian conditions?

Let us see what some of those policies are.

The above mentioned Report of the British Reconstruction Committee * reads:

“It is obvious that improvement in the commercial prosperity of a country—that is to say, the average purchasing power of the individual—depends on increasing the output per head. If the wages be raised merely by increasing the selling price of the goods in the home market there is no real advance, and to increase the selling price of the goods in the neutral and open markets of the world is hardly possible in view of international competition. The only way to increase prosperity is to increase the net output per head of the workers employed..... In the United States the amount of power used per worker is 56 per cent more than in the United Kingdom. If we eliminate workers in trades where the use of power is limited or even impossible, we shall probably find that in the United States the use of power where it can be used is nearly

* See page 16 above.

double what it is here. On the other hand, not only are the standard rates of wages higher in the United States but living conditions are better. There is little doubt that in the United States the average purchasing power of the individual is above what it is in this country, and that this is largely due to the more extensive use of power which increases the individual's earning capacity."

At different places in Mr. Henry Ford's two books already referred to we find the following ideas:

"It is true that petty business can work on the capital-labour-public mistake, but big business cannot, nor can little business grow big on the theory that it can grind down its employees. The plain fact is that the public which buys from you does not come from nowhere. The owner, the employees, and the buying public are all one and the same, and unless an industry can so manage itself as to keep wages high and prices low, it destroys itself, for otherwise it limits the number of its customers.".....

"It ought to be clear, however, that the high wage begins down in the shop. If it is not created there it cannot get into the pay envelopes. There will never be a system invented which will do away with the necessity of work. Nature has seen to that. Idle hands and minds were never intended for any one of us. Work is our sanity, our self-respect, our salvation. So far from being a curse, work is the greatest blessing. Exact social justice flows only out of honest work.

"If we can distribute high wages, then that

money is going to be spent and it will serve to make storekeepers and distributors and manufacturers and workers in other lines more prosperous and their prosperity will be reflected in our sales. Country-wide high wages spell country-wide prosperity, provided, however, the higher wages are paid for higher production.

"It is this thought of enlarging buying power by paying high wages and selling at low prices which is behind the prosperity of this country....

"To effect the economies, to bring in the power, to cut out the waste, and thus fully to realize the wage motive, we must have big business which does not, however, mean centralized business. We are decentralizing."...

"An unemployed man is an out-of-work customer. He cannot buy. An underpaid man is a customer reduced in purchasing power. He cannot buy. Business depression is caused by weakened purchasing power. Purchasing power is weakened by uncertainty or insufficiency of income. The cure of business depression is through purchasing power, and the source of purchasing power is wages.

"There can be no true prosperity until the worker upon an ordinary commodity can buy what he makes. Your own employees are a part of your public. The same ought to be true everywhere, but one of the difficulties in Europe is that the workman is not expected to buy what he makes. A part of Europe's trouble is that so much of its goods has

gone abroad in the past that there is little thought of really having a home market....

"If an employer does not share prosperity with those who make him prosperous, then pretty soon there will be no prosperity to share.

"The facilities to produce are present, but these facilities are greater than the ability to consume, and there can be no peace on this earth until the ability to consume is brought up to and kept up to an equality with the ability to produce. This equality cannot be brought about until what we have called the wage motive replaces the profit motive.

"Outside the United States, the wage motive has never gained a foothold. Business is mostly in the hands of financiers and is run for profit and not as serviceable element in the common social life..... "

The essence of this same idea was urged in relation to India by Sir Charles Trevelyan, K.C.B., in his testimony on June 23, 1853, before a committee of the House of Commons, in the inquiry into the question of extending the charter of the East India Company. Replying to a question, he said, "I estimate those advantages of considerable value; but I can conceive they are not to be compared with the immense trade which would be carried on with India if it were highly cultivated and improved, and the natives were possessed with the means of purchasing our manufactures, even in a much smaller degree than is the case in most of our colonies."

By way of bringing Mr. Ford's remarks up to date,

here is a news item clipped from the *Lahore Tribune* of July 1, 1927 :

" AMERICAN WORKER

Increase in Income

"The average income of the American wage-earning family is now one-third larger than in 1914, according to a study by the National Industrial Conference Board, a privately endowed organisation for economic research. The Board finds that while the cost of living is almost 64 per cent higher than before the war, wages are more than twice as large and real purchasing power on an average is enhanced by 34 per cent. This is due in part to higher wage rates and in part to more steady employment."

Let it be noted that although Britain uses very large amounts of physical power, she has not adopted the American policy of high wages and a consequent large home market. This is one cause for her difficulties, and why she is not now as prosperous as the United States. The high wage policy was not widely adopted even in the United States till after 1920-21.

To look at the matter another way, the combination of modern power-driven machinery and capitalism has given such enormous productivity that the so-called law of supply and demand has become inverted. As one author puts it,* "Under the regime of hand production, the problem was to supply consumers with commodities. The problem is now how to supply commodities with consumers." This is now especially well recognized in America. For example: "One of

* R.A. Freeman—*Social Decay and Regeneration*, Constable, London, 1921, p. 129.

the objects of industry is to create as well as to supply consumers".* "How to produce enough is no longer any problem at all. How to sell what is increasingly produced that is the problem."† "It is as important to produce consumers as to produce goods."‡

If this be so, it is of the utmost importance to modern industry to increase the buying power of the masses.

Widespread increased purchasing power is the same as a more equable distribution of wealth throughout the population. This is a form of social justice and promoter of social stability which has long been sought in every country. It seems to have existed in India at one time, and the general use of hand spinning wheels and hand looms was probably largely responsible for it.§ They enabled a sound balance to be maintained between manufacturing and agriculture. The re-attainment of

*Henry Ford *Today and Tomorrow* p. 152.

†Garet Garrett *Ouroboros* Kegan Paul, London, 1926.

‡E. A. Filene *The Way Out* Doubleday Page, New York 1924.

§See the records of early travellers and historians such as Arrian, The Elder Pliny, Marco Polo, Barbosa; Varthema, Caesar Frederic, Bernier, Tavernier, Pyrard, Sulaiman, Ralph Fitch, Thavenot, Alexander Hamilton. Also Rhys-Davies—*Buddhist India*, Fisher Unwin, London, 1903, pp. 101-102; references in Bal Krishna *Commercial Relations between India and England, 1601-1757*—Routledge, London, 1924; James Mill—*History of British India*; Elphinstone *History of India*; W. Foster *Early Travels in India* Oxford Univ. Press, 1921; Reports and letters of early East India Co. servants such as Montgomery Martin, Bolt, Verelst, Orme, Hastings, Clive, Dr. Taylor; Reports from Committee of the House of Commons, Vol. V, 1781-82, printed 1804; Burke, *Collected Works*, Vol. VIII, Ninth Report from the Select Committee on the Administration of Justice in India; Dr. Royle *Arts and Manufactures of India*, Lectures on the Results of the

this condition of equable wealth distribution, or something approaching it is of exceedingly great importance. The United States is trying to work toward it through increased use of power, high wages and widespread stock and bond ownership by employees and consumers. The last of these methods is not now applicable in India but she may work toward the same goal by the more simple and direct devices of charkha and handloom.

A little reflection will make clear that the charkha plan is the best possible application of those American policies to the Indian situation. At a minimum of cost and time it will provide work for millions. It will develop and use much physical power and transform it into one of the primary necessities of the people. The goods produced will be distributed more widely and directly than under any other plan. It will not give high wages, but it will give more and higher wages than at present exist in India, on the average. It is the first step toward high wages. Incidentally it will result in an increase in purchasing power very large in the aggregate, and accumulative in effect. Such an increase may easily amount to many hundreds of millions of rupees, as shown in Chapter VIII. Yet it is such an increase as gives security to the peasant. What he gets thereby is not money that can be taxed out of him or cajoled away by tempting advertisements, but clothing for his immediate use. Indirectly and slowly his ability and desire

Great Exhibition of 1851, First Series; references in P. J. Thomas *Merchantilism and the East India Trade*, P. S. King & Son, London, 1926.; Brooks Adams *Law of Civilization and Decay*; James Cotton *India*, English Citizen Series.

for more fair trade will increase. We do not mean by all this to fall into the illusory Western idea of a "high standard of living," which in fact is mainly a high standard of wasting. Nevertheless, there is room for a considerable rise in the consuming power of the Indian peasantry before their expenditures become extravagant.

If these things be so then the khaddar movement deserves the support of every mill owner, merchant, banker, banya, sowcar, mahajan, and of Lancashire itself. If khaddar were worn by all the people of India, (nearly one-fifth of the world's population), the indirect improvement in the consuming ability of the world as a whole would be so immense as to bring about a revival in world trade."

*See J. A. Hobson—*Economics of Unemployment*, Allen & Unwin, London, 1922, for further explanation of the effect of increased purchasing power; also, P.W. Martin *The Limited Market*—Allen & Unwin, London, 1926; also various publications of the Polak Foundation for Economic Research, New York city.

CHAPTER VI

DECENTRALIZED PRODUCTION AND DISTRIBUTION

It is very difficult for a European or American or anyone else who has spent his life among Western conditions to realize how different is the Indian economic situation. Such factors as climate, customs, food, clothing essentials, housing, prevalence of hook-worm, kala-azar, malaria, cholera, and other energy-sapping diseases, rate of infant mortality, expectation of life, relative absence of mechanical or factory discipline or habits, conservatism of thought and action, valuation of time, habituation to and appreciation of value of certain forms of cooperative group activity, purchasing power, extent of literacy and book education, social systems, standards of living, permeation of religious considerations into other activities and phases of life, relative percentages of rural and urban population, scale and concentration of production and distribution of material goods;—all these in India differ profoundly from those prevailing in the West. It is with the last two of these factors that this chapter deals. They have to be lived among in order to be understood and appreciated. And he who would truly understand them must live them in the Indian way—not merely alongside them with a social barrier between, as is the custom of practically all Westerners in India.

In England and Wales 22 per cent of the population

live in rural areas, but in India 90.5 per cent of the population live in villages and rural areas.

Together with this fact about India goes the great conservatism of the people, the retention of old, old methods of work; millions of handicraft producers; village markets, tiny shops; small-scale production and distribution everywhere. In a very large proportion of purchases the transaction is directly between the maker and the ultimate consumer,—not even one middleman. A producer does not expect to sell his wares a hundred miles away, but to his neighbour in the same or a neighbouring village. The speed of work of all kinds is adapted to the scale and mode of living.

It may be said that the speed of life and work in the Orient, deriving its power from the annual current flow of solar energy, is very much like that of most organic life. To a Westerner it seems exceedingly slow. But it is not to be despised on that account. We do not despise either the rose or the turnip for their organic rate of growth. Indeed, perhaps this very direct connection and harmony with sunshine, the greatest of all natural powers, is one reason why Oriental life, at its best at any rate, exhibits certain qualities often missing in the West,—serenity, poise, dignity, spaciousness, proportion, graciousness, deep-rooted sureness and elemental simplicity and beauty.

In relation to the situation the speed is not so inefficient as it seems to the European or American tourist used to highly centralized and mechanized modes of living; though even for Indian conditions the rate of work is no doubt often unfortunately slow, as a result

of such diseases as malaria, hookworm, cholera, enteric, etc.

Both production and distribution are decentralized and on a small scale. Such an economic scheme is more than familiar to the Indian people. It is a part of their mental operations and habitual responses and methods of living. They cannot, while in India, think or work easily or efficiently in Western rapid, large-scale ways.

As the Earl of Ronaldshay, former governor of Bengal says in his book *India: A Bird's-Eye View* :^{*} "I find it difficult to escape from the conclusion that the organization of industries on the lines evolved by Western nations—industries, that is to say, which require a huge array of machinery driven by mechanical power, steam, hydraulic, or electric, and which necessitate the aggregation of vast numbers of human beings to perform for a fixed wage so much of the operation as cannot be performed by the machine itself—is something which is altogether alien to the genius of the Indian people."[†]

In connection with the decentralization of Indian production it is important to note that cotton can be and is grown in almost every province in India.

The charkha and hand-loom are obviously adapted to this situation. They and it have been integrated for thousands of years.

^{*}Constable, London.

[†]A good description of Indian regional economics and its details, advantages and possibilities is found in Prof. Rahakamal Mukerjee's *Principles of Comparative Economics*, 2 vols. P. S. King & Son, Ltd., London.

But along comes the Western engineer, manufacturer, merchant or traveller, used to different conditions and ways. Instantly he condemns all this as primitive, wasteful and uneconomic. Indians who follow Western ways have similar beliefs.

But, curiously, we now find one of the most progressive and successful manufacturers in the most prosperous of all the countries returning to this "primitive" way of producing, in ways, of course, suitable to Western conditions. Mr. Henry Ford is splitting up his huge factories into small, decentralized units in villages. He doesn't like the slums of big cities, and he finds that it costs less to produce in small units. For a full statement of his reasons and experience, and some of his plans in this respect the reader should consult his book, *Today and Tomorrow*, especially the chapters entitled "The Meaning of Time" and "Turning Back to Village Industry." And in his other book, *My Life and Work*, see the chapters on "Getting into Production" and "The Railroads."

Four quotations will suffice.

"Wherever it is possible, a policy of decentralization ought to be adopted. We need, instead of mammoth flour mills, a multitude of smaller mills distributed through all the sections where grain is grown. Wherever it is possible, the section that produces the raw material ought to produce also the finished product. Grain should be ground to flour where it is grown. A hog growing country should not export hogs, but pork, hams and bacon. The cotton mills ought to be near the cotton fields. This

is not a revolutionary idea. In a sense it is a reactionary one. It does not suggest anything new; it suggests something that is very old. This is the way the country did things before we fell into the habit of carting everything around a few thousand miles and adding the cartage to the consumer's bill. Our communities ought to be more complete in themselves. They ought not to be unnecessarily dependent on railway transportation. Out of what they produce they should supply their own needs and ship the surplus. And how can they do this unless they have the means of taking their raw materials, like grain and cattle, and changing them into finished products? If private enterprise does not yield these means, the co-operation of farmers can. The chief injustice sustained by the farmer to-day is that being the greatest producer, he is prevented from being also the greatest merchandizer, because he is compelled to sell to those who put his products into merchantable form. If he could change his grain into flour, his cattle into beef, and his hogs into hams and bacon, not only would he receive the fuller profit of his product, but he would render his near-by communities more independent of railway exigencies, and thereby improve the transportation system by relieving it of the burden of his unfinished product. The thing is not only reasonable and practicable, but it is becoming absolutely necessary. More than that, it is being done in many places. But it will not register its full effect on the transportation situation and upon the

cost of living until it is done more widely and in more kinds of materials."

..... "As a general rule, a large plant is not economical."

..... "We have not drawn men from the farms—we have added industry to farming."

..... "Big business, keeping service to the public always in mind, must scatter through the country not only to obtain the lowest costs but also to spend the money of production among the people who purchase the product."...

"Farming then shows up as the part-time job it really is, and straight farming will eventually have to be considered only a side issue. Farming is no exception to what might be called the rule of nature that one month's work will not support twelve months living. The real problem of farming is to find something in addition to farming for the farmer to earn a living at. That is the plain, rough truth.

"As has been set out in a previous chapter, the decentralization of industry will provide these jobs to supplement the farm work. Industry and agriculture have been considered as separate and distinct branches of activity. Actually they fit into each other very neatly....The farm has its slack seasons, and so has industry; the two can be made to fit in together, and the result will be more and cheaper goods and food for every-one."

When we think of peasants in their cottages operating charkhas as being really a decentralized series of

power-stations transforming and utilizing solar energy, we see at once that the principle is the same as the scheme urged by the late Charles P. Steinmetz, the famous engineer of the General Electric Company of America. After describing the prevailing policy of collecting water in huge expensive resevoirs and generating an enormous quantity of electricity in a large and costly hydro-electric plant and then distributing the current to consumers, he urged that instead, there should be many hundreds of small hydro-electric turbine generating stations scattered all over the water-shed, and the current gathered from them in a central station and re-distributed.

He stated,...“ But the higher cost of the hydraulic work makes such development feasible only where large amounts of water are available in fairly concentrated form, and with the increasing development of water sites, the number of water powers capable of development by our present methods is decreasing, while most of the country's potential water powers cannot be developed by our present standard methods of hydro-electric generation, as the cost of the necessary hydraulic development, to collect water, is greater than the value of the power which may be collected. The only hope which can be seen for a more complete utilization of our country's hydraulic power,...lies in applying to electric generation the same principles which have made the electric motor successful, that is, bringing the electric machine to the place of the power. That is, just as we place individual motors at every machine where mechanical power is required, and distribute the

power to them electrically, so to place individual electric generators wherever along the water course hydraulic power is available, and collect the power of all these generators electrically."*

The analogy to the charkha is clear. Instead of massing workers in expensive cities and cotton mills, take the spindles to the workers in their homes all over the land and utilize the power where it originally exists.

Similar beliefs as to the value and necessity of decentralization are expressed by one of the most successful of American merchants, Mr. Edward A. Filene, in his book, *The Way Out*†. Thus the principle is approved by strong authority both for production and distribution.

In relation to Indian cotton cloth, the economic advantages of small-scale, decentralized production and distribution as compared with modern, power-driven, large-scale, centralized industry and commerce may be summarized as follows:—

(a) SAVINGS IN COST

Elimination or great reduction of existing costs due to:—

1. Assembly of raw material
2. Storage of raw material
3. Railway and steamship transportation
4. Baling or packaging required by long transportation

* General Electric Review 1919. Cited in Polobov. *Mastering Power Production*, (above cited), P. 414.

† Doubleday Page & Co., New York, 1924.

5. Injuring and waste of cotton fibre by high-speed power ginning and carding*
6. Injury of cotton seed by such gins, and mixture of seeds of different strain and grades †
7. Certain steps in processing, rendered necessary by condition of material as a result of large-scale assembly, long-time storage in bales, long transportation; e.g. opening of bales, removing impurities, removing adverse effects of compression, etc.
8. Irremediable damage from transportation, storage and large-scale handling
9. Fire and theft insurance on materials and products
10. Storage of completed product
11. Advertising
12. Obsolescence of product due to changes of taste and fashion
13. Money, labour, land, fuel and other facilities and materials being wasted or diverted into luxury production
14. Brokers' 'wholesalers', commission-men's and other handlers' and middlemen's charges and profits
15. Fluctuations in prices of both raw material and finished product: also speculation therein‡

* and † See Sir George Watt—*Commercial Products of India*, pp. 593, 611. Also W. H. Johnson—*Cotton and its Production* Macmillan, 1926, pp. 135, 140-143.

‡The Memo on Cotton for the International Economic Conference, above cited, at p. 6 says, "It has been dangerous to hold

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16. Overhead costs arising from
 - (a) large clerical and sales forces
 - (b) expensive machinery, buildings, land and other equipment
17. Fuel and power charges
18. Legal expenses
19. Bankers' charges for loans, discounts, etc.
20. Income and super taxes
21. Municipal taxes and water rates
22. Repair and maintenance of machinery and buildings
23. Depreciation and obsolescence of machinery, boilers, buildings and equipment
24. Workmen's compensation, insurance or legal damages to injured employees
26. Fire insurance on buildings and machinery.

(b) REDUCTION OR ELIMINATION OF RISKS DUE TO

1. Famine or crop failures
2. Fire
3. Theft
4. Strikes or lockouts
5. Transportation delays

(c) INDIRECT EFFECTS OR CONCOMITANTS
ECONOMIC AND SOCIAL

1. Reduction in cost of living as a result of lightening the burdens listed under (a)

stocks of yarn and piece goods when a sudden fall in the price of the raw material might entail corresponding falls in the value of stocks."

2. Greater freedom from foreign financial and commercial interests and control
3. Improvement of quality of product in respect to durability, adaptability to use, and beauty*
4. Reduction of social evils such as slums of cities, physical and moral deterioration due to city life, unemployment and its fears and moral degeneration
5. Decrease of tendency to urbanization and consequent reduction of national expense for railways, municipal works, etc
6. Reduction of power of financiers, large and small, over the lives of people
7. As one element of 6, a reduction in the amount of credit and credit instruments needed in trade and hence a check on the inflation of credit and private and irresponsible control of credit with its consequent rises in prices
8. More leisure
9. More health and bodily and mental energy
10. Enhancement of creative motives and a reduction of the opportunities and temptations for acquisitiveness, greed and imperialism

* See authorities cited in Chap. VIII. Also *The Basis for Artistic and Industrial Revival in India* by E. B. Havell, Late Principal of Government School of Art and Keeper of the Art Gallery, Calcutta, 1912. Theosophist Office, Adyar, Madras, India. Also A. K. Coomaraswamy—*Art and Swadeshi*, Ganesh & Co., Madras.

11. The release, for purposes of growing food, of excess land now used for growing cotton*

In the above referred to bulletin of the American Cotton Manufacturer's Association the following figures are given for the year 1925 as the elements in the cost of cotton cloth per pound.

	Cents.
Labour	... 6.65
General expenses	... 6.35
Cotton at the mill	.. 28.28
Percentage of waste, net	... 11.08
<hr/>	
Total	... 41.27

The item "general expenses" amounts to 15.3 per cent of the total. Although it is not stated what items it includes, presumably they are of the nature of those listed under (a) in the above summary of savings of costs. The heavy reduction or elimination of them would be a considerable economy.

Additional information as to the extent of these savings is given in *Hand Spinning and Hand Weaving* above referred to, at page 213. On that page is an

* Regarding excess land devoted to cotton see Sir George Watt—*Commercial Products of India* 1908, p. 623. Also Satish Chandra Das Gupta—*Khadi Manual*, Khadi Pratisthan, Calcutta, Vol. II, p. 132.

For detailed estimates of such losses as are listed under A, B and C, even in a country supposed to be as efficient as the United States see Stuart Chase—*The Tragedy of Waste* Macmillans, New York, 1926

analysis of the items of cost of production of five typical mills in Ahmedabad. We reproduce it below.

Items in the cost of production	Gujarat Spinning Mills	Bharatkhand Cotton Mill	Ahmedabad Manikchand	Ahmedabad New Cotton	Raj-Nagar Mills	Average per cent
1. Wages	15.9	17.6	16.5	14.8	21.2	17.
2. Stores	18.3	8.8	9.7	11.4	11.2	12.
3. Fuel	3.6	4.1	3.4	3.1	3.6	3.5
4. Interest	1.2	2.9	2.6	3.4	—	2.5
5. Commission	1.3	2.9	4.3	4.0	—	2.5
6. Taxes	9.9	5.9	7.1	3.1	4.2	5.5
7. Cotton	44.2	50.0	48.0	53.5	64.0	52.
8. Depreciation	5.1	2.9	2.3	2.8	—	3.

The book goes on to say :—

“The charges on fuel, insurance and commission taxes and depreciation cover nearly 15 % of the costs in the mills. Hand-power, though it may have to be paid for far more heavily both in spinning and weaving, will certainly save for the nation all the wasteful costs in mill production and leave a wide field for securing national economies.”

And at page 209 it says:—“With the standardization of wages, both for spinning and weaving, the stocking of cotton by the spinner himself, improvements in output both on the loom and the charkha,

and the very great increase in the volume of production generally there will result far-reaching economies which will make khadi price levels compare more favourably."

The importance of having the spinner stock his own cotton will be realized from the fact that, as an element in the total cost of cloth, the cost of raw cotton is 68.5 per cent in the American mills and 53 per cent in the Indian mills, according to the foregoing figures. The same book states on page 165, "The bulk of our spinners in India are either growers of cotton or farm labourers in cotton fields. Some of them even get their wages paid in cotton. Others who own land reap the cotton crop." Clearly, all such can obtain cotton at much lower cost than the mills can. Since cotton grows in almost all provinces and districts, it will be possible for the great majority of spinners to stock their own cotton. This will save more than the present great sums spent on railway and cartage transportation of raw cotton, large-scale cotton storage, insurance, and losses due to fluctuations in price during storage; and unemployment due to such fluctuations. Also as this book further points out (pp. 166-8):—

"He who has stocked his cotton in time will be able to add the ginning to his spinning wage and besides keep what remains of cotton seed to himself. The retention of good cotton seed means no little to the farming home. The spinner would be able to share the profits of rising prices for cotton in the prices of yarn that he will get or bargain for, while during periods of falling prices, he can always,

conserve the use of part of his labour for his personal needs.

"When the spinner learns to stock his cotton, the quality of handspun yarn will be seen to improve by a bound. Having a property in the cotton; the spinner has necessarily to practise the greatest circumspection and economy and make the best use of the raw material. The quality of yarn records at once a remarkable improvement. The cotton is ginned and cleaned with care. The incentive to use as little of the raw material as possible so that there may be no want of stock at any time during the "no cotton seasons" and yet obtain fair prices for the yarn, makes him spin even and fine."

These savings are really the same as are secured by the American "trusts" or big companies which own and operate their sources of raw material as well as the factories. Their gigantic efforts to control the sources of their raw material is only a re-discovery and imitation of the economic position of the simple peasant artisan who cultivates for himself the cotton which later he weaves into khaddar.

The validity of the item (c) 7 in the foregoing list of economies will doubtless be challenged by most people; but those who have thoroughly studied the way money and credit actually works will perhaps be more inclined to agree. Until money ceases to fluctuate in value and thus act like a false weight or measure, the poor man will be wise to eliminate it as much as possible from his life. Village barter and family spinning, ginning and carding will be a great help in this respect. The use of

the charkha and its relatives does not involve debts, loans or interest. It is a step away from the mahajan or sowcar. All who know of the terrible burden of debt on Indian peasants will see the value of this. To the extent that bills of lading, bills of sale, cheques and other instruments of credit needed by cotton mills for initial expenses of buildings and machinery and in their large-scale buying, manufacturing and selling operations can be reduced in quantity by the people manufacturing their own cloth, an appreciable check may be placed on the expansion of credit which, under present conditions of irregular private banking control, constitutes so large an element in the fluctuation of prices and consequent hardship on the poor man.*

The consideration of all these economies possible under small-scale production reinforces the point discussed in Chapter IV; namely, that large-scale, high-speed machinery is adapted to and can be efficient and profitable only with a large market. For small, decentralized markets, hand-operated machines may be, it seems, just as efficient by both engineering and price criteria. And when broader social and psychological factors are considered, the slower implements are probably better and more conducive to a sound and permanent civilization. † At all events, they may not

* For a full discussion of this important point see *Wealth, Virtual Wealth and Debt* by Fredrick Soddy, F.R.S., Allen & Unwin, London, 1926. Also his pamphlets, *Cartesian Economics* and *The Inversion of Science*, Hendersons, London, 1924.

† See Freeman—*Social Decay and Regeneration* above cited, pp. 105—140.

be condemned without far more thorough investigation of the problem than has hitherto been made. Mr. Gandhi's project has as sound economic support in reason as any other existing or proposed scheme. Here, too, the Earl of Ronaldshay's book may again be quoted. "The fundamental cause of the disappointing results of nigh-on three-quarters of a century of endeavour is to be found in the incorrigible belief of the English as a race in the superiority of their own institutions over those of all other people, however the conditions may be." This remark applies to all Western peoples in relation to their economic methods and organizations. Westerners are frequently too complacent and too sophisticated to be able to see the physical, scientific, economic and moral realities which inhere in modes of living simpler than their own.

Thus we see that the economic strength and efficiency of small-scale, decentralized, intensive industry such as Mr. Gandhi advocates lies in its low fixed charges, low power costs, low expenses for repair, maintenance, obsolescence and depreciation, low inventory charges, rapid turnover of material and product, little or no storage and transportation costs, security of employment, psychological and physiological healthiness and adaptation to man's nature, its moral and aesthetic possibilities, its freedom and room for sound individual development.

The outstanding defect of small-scale, decentralized social organization is the prevalent slowness of intellectual stimulus. It is not too much to expect, however, that by means of a good educational system, a wise use

of books, papers and journals, and improved means of communication and transport this defect could be almost wholly eliminated.

There is an old English proverb about the folly of "carrying coals to Newcastle" (a great coal mining centre and coal shipping port). And Mr. Ford remarks that "to carry a product 500 miles to the consumer, if that product can be found within 250 miles, is a crime." It does seem silly, then, to carry Indian cotton to Japan, Italy or England and then carry it back as cloth and sell it to the villager who perhaps grew it. The apparently greater efficiency of the transaction as registered by existing comparative money prices of khaddar and mill cloth would, we believe, be found illusory if full account were given to the *national* costs of unemployment, disruption of normal village life, impairment of the former sound balance between manufacture and agriculture in both India and the highly industrialized nations, etc. The individual purchaser of cloth does not feel these intangible costs directly, but they nevertheless oppress him. An attempt to estimate their extent will be made in another chapter.* Many

* To fully understand the double harm involved in this double destruction of a normal balance between agriculture and manufacturing in both India and England, one should read at the same time the story of the destruction of Indian domestic cloth manufacture, as given in records and histories previously cited herein and J. L. and B. Hammond's *Village Labourer*, *The Town Labourer*, *The Skilled Labourer*. Longmans Green, and *The Rise of Modern Industry*, Methuen, 1926, London. The further idea of the waste of solar energy resulting thereby and the full use of land as the location for the transformation and development of solar power ties in

of the costs of Western industrialism are disguised, but show up partly in the high cost of living and high taxes.

It is sufficient to note here, however, that to stigmatize village handicraft in India as "uneconomic" merely reveals a certain unfamiliarity with both Indian and Occidental modern economic conditions and tendencies, and a failure to analyze the situation fundamentally and as a whole.

Economic principles may be the same all over the world, but local differences call for varying applications and expressions.

interestingly with the thesis of *Land Tenure and Unemployment* by Frank Geary, Allen and Unwin, London, 1925, and with Henry George—*Progress and Poverty*.

CHAPTER VII

UNEMPLOYMENT

Professor Marshall, the great English economist, is quoted as having said at the Ipswich Co-operative Congress, * "In the world's history there has been one waste product so much more important than all the others that it has the right to be called *the* waste product. It is the higher ability of the working classes, the latent and undeveloped, the choked up and wasted faculties for higher work that for lack of opportunity have come to nothing."

Mr. Lipson in his little book on *Increased Production*, published in the "World of Today" series by the Oxford University Press, says, "The wealth of a country lies primarily in the capabilities of its people. A land which abounds in natural resources, but whose population is sluggish and backward, will be poor compared with a land whose natural resources are inferior, but whose inhabitants are full of vitality. Anything which adds to the efficiency of labour increases the national dividend; anything which impairs efficiency diminishes the national dividend. It follows, therefore, that no community can afford to allow its members, through no fault of their own, to lose their power of producing wealth. Nor ought we to forget the humanitarian aspect of the problem or the fact that the fear of destitution

* Quoted from *Co-operation the Hope of the Consumer* by E. P. Harris, Macmillan, New York, 1919. p. 155.

hinders the co-operation of labour in the work of production."

A member of the International Labour Office at Geneva, Mr. J. R. Bellerby, in his book on unemployment says :—

"Unemployment is a scourge. If the manipulation of one factor in industrial organization may lead in any way to a diminution of the evil, the immediate duty of all concerned would seem to be . to strengthen this factor when possible, and determine the soundest criteria for its use."

Mr. Morris L. Cooke, a prominent American engineer and president of the Taylor Society, recently stated. *.....

"Unemployment is the most important single source of waste.....

"It is all very well to advocate greater production through the introduction of machinery, the increased use of mechanical power, through standardization and through advanced technique of one kind or another. Society as a whole does profit as we learn to make two pairs of shoes at the cost formerly required for one. But until we can guarantee to the individual a higher measure of protection in making his or her contribution to the increasing effectiveness of our national production, our enthusiasm must necessarily be tempered with the thought that with each step forward the spectre of unemployment is actually raised. We can hardly expect the interest and much less the

* See his article on "Waste through Unemployment" in *The American Federationist*, June, 1927, p. 700.

whole-hearted support of the workers who are most likely to be adversely affected until we see in unemployment the very core of the problem of waste elimination.....But after all, looked at from the national and economic standpoint, what we all want,—employers and employees alike,—is the substance of continuous employment rather than protection against unemployment. "

Probably no one will dispute these statements. In view, then, of the extent of unemployment in India, as set forth in Chapter II and in Appendix B, it is important to consider its relation to Mr. Gandhi's programme.

In Chapter II we learned from the 1921 census figures that there were approximately 107,000,000 "actual workers wholly engaged in pasture and agriculture." Also that they are idle at least three months of the year. Note that this figure does not include any industrial unemployment,—only that in agriculture. It does not include any of those city industrial wastes classified under the heads of intermittent unemployment, underemployment, seasonal unemployment, cyclical unemployment, residual unemployment, labour turnover, lost time, strikes and lockouts, absenteeism, idleness due to preventable accidents or preventable sickness.

One hundred and seven million people is one third of the entire population of India. It is about 72 per cent of all "actual workers in all occupations in India,

* See also Stuart Chase *The Tragedy of Waste*, Ch. VIII, Macmillan, New York, 1926.

according to the 1921 census. It is only a little less than the entire population of the United States.

In Great Britain the worst unemployment in any month of any year, so far as figures show, was 2,171,288 in June, 1921, the year of the great depression and coal strike. This was roughly one-twentieth of the total population of Great Britain, or 17.81 % of the membership of trade unions which report to the Board of Trade. That was sufficient to trouble British statesmen profoundly. What would they do if over one-third, instead of one-twentieth, of their population were idle at a time, or the equivalent of over one-twelfth all the time, and this continued year after year?

Although we do not have any figures for China, it is probably safe to say that unemployment is greater at all times in India than in any other country in the world.

In the West, manufacturers are becoming aware of the dangerous expense of idle machinery and equipment, and are devising cost accounting methods to show its extent and causes; and studying how they should allocate it. They are considering whether to put it into the selling price of the product, and thus make the consumer bear the cost of managerial inefficiency, and at the same time confuse the management as to what prices to set and what sales policies to follow; or to show it as a separate loss to the manufacturer, and then try to reduce it by specific methods, but not charging it on to the consumer.

In the same way, it is time that the Indian nation should begin to understand the separate costs of its

unemployed people and begin to be guided thereby toward intelligent remedies.

What does Indian rural unemployment cost the nation?

Let us assume an average daily wage for agricultural workers as three annas. This is only a conservative guess, but it is founded on data given in Rushbrook Williams' *India in 1923-24*, Bombay wage reports, the fact that the Government daily famine wage is a little less than two annas a day, the estimates of per capita income referred to in the Introduction, etc. At this 3 anna rate, 107,000,000 people in 90 days, the period of their idleness, could earn Rs. 1,805,625,000. This, then may be considered the annual cost of unemployment among only the agricultural population of India, exclusive of Burma. If divided among the total population, it makes a cost or sort of tax of about Rs. 5-7-0 per capita.

Let us now compare this amount with some of the other expenses or items affecting the prosperity of the Indian nation, as shown in the latest census data, *India in 1925-26*, and the *Indian Year Book* for 1923-24.

	Rupees
Total taxation, including land revenue, 1921-22	... 1,251,348,997
Total revenue of Central Government 1924-25	... 1,380,392,244
Total expenditure charged to revenue, 1924-25	... 1,323,566,546
Total interest on the public debt, 1921-22, both Central and Provincial	. . 309,696,655

	Rupees
Gross Indian Military Expenditures in India and England, 1921-22 ...	778,798,340
Total expenditure on education, 1921-22 ...	183,752,969
Total Government expenditure on famine relief, 1921-22 ...	8,832,026
Value of jute manufactured in India, 1921-22 ...	404,940,000
Total imports of cotton manufactures, 1924-25 ...	820,000,000
Total exports of raw cotton, 1924-25 ...	910,000,000
Total exports of cotton piece-goods, 1924-25 ...	68,600,000
Working expenses, direct and indirect, productive and unproductive, of all irrigation and navigation works, 1921-22. ...	38,316,643

Thus the annual cost of agricultural unemployment is seen to be greater than any of these other great national expenses or incomes. Remember also that the real cost of unemployment is probably much in excess of the above estimate, because the values produced by these people at work would be considerably greater than merely their wages. Also in most provinces now (1927) agricultural wages are in fact from 5 to 8 annas a day for men and from 4 to 6 annas for women. We have purposely chosen a low figure in order to be conservative.

But if that sum seems too large, suppose that these people were not put to ordinary work, but were given only what they could earn by spinning,—say one anna a day. That would give an estimated cost of Rs. 601,875,000 per annum. Compare that with the foregoing items of Indian expenditure. It is greater than the total value of jute manufactures in 1921–22. Or, if you like, suppose only the women * among these people could ever be got to spinning. Even on that basis, the annual unemployment cost would be about Rs. 193,595,000. Again, compare that with the above figures. It is greater than the total expenditure on education in 1921–22.

On any basis of calculation, it is clear that unemployment creates a staggering burden upon the Indian nation, and indeed upon the world.

Let us now develop a special application of these figures of unemployment costs. It is hypothetical, but nevertheless of use for the present discussion.

Although the historical records show that two hundred and fifty years ago spinning was practised in almost every household in India, and that it was intentionally and systematically destroyed by British policy †, we cannot, of course say that the present unemployment is wholly due to that cause. Nor can we allot any particular portion of it to any particular cause. Yet we can say that the importation of foreign cloth has deprived the farmers of their former supplementary occupation, and that if, for instance, only one-quarter

* Estimated number in this group, based on census figures, excluding Burma, 34,417,000.

† See historians cited in notes in Chapters IV and V.

of the farmers now idle would take up spinning, it would vastly relieve that part of the unemployment. And we may also say that the continued purchasing of foreign cloth by India prevents that accomplishment, in the sense that it cannot fully take place until the purchase of foreign cloth very greatly decreases. Hence, in that special sense, we may say, for purposes of argument, that the purchase of foreign cloth is a cause of, say, one-quarter of the present agricultural unemployment. In 1925 over one-third of the total Indian consumption of cloth was imported.

The average per capita consumption of cloth in India is estimated by the correspondent of the *Manchester Guardian Commercial* at 13 yards.* Mr. Gandhi estimates it at 14 yards per head. Taking the larger figure, so as to get a more conservative result, and taking the total population of India at 319,000,000, we see that the total annual cotton cloth consumption is about 4,466,000,000 yards.† One-quarter of the present agricultural unemployed would be 26,750,000 people. (This small part is chosen so as to err, if at all, on the side of conservatism.) At a wage of 3 annas per day, this would give Rs. 451,406,000 as the cost of their unemployment for three months in the year. Dividing this loss by the total cloth consumption in yards gives 1 anna 9 pies. On the above assumptions, this may be

* See *Lahore Tribune*, April 17, 1927. p. 8.

† In the *Memorandum on Cotton*, *International Economic Conference* League of Nations, Geneva, 1927. p. 17, (publ. by Constable, London) the average annual consumption for the period 1922-26 is estimated as 4,328 million yards.

said to represent the cost of Indian rural unemployment for each yard of cloth purchased. If instead, we were to divide the Rs. 451,406,000 by only the yardage of foreign cotton cloth purchased, (1,090,421,921 yards in 1921-22), the result would be 6 annas 2 pies per yard.

We may then say that when foreign cotton cloth is purchased in India, at least 1 anna and 9 pies, and probably much more, of the price per yard could be deducted if the Indian rural unemployment were relieved by getting one-quarter of the agricultural workers to spin and weave by hand.

Therefore, to get the real competitive comparison between the cost of mill cloth and the cost of khaddar, from 1 anna 9 pies to 6 annas 2 pies per yard should be added to the cost price of the mill cloth or deducted from the price of the khaddar. This should be considered in connection with the question of price competition between mill cloth and khaddar, in Chapters III and IV.

Again, suppose we consider this idleness as an affair of Empire. How does it affect Britain?

According to the Memorandum on Cotton, previously cited, in 1925 a little over 32 per cent of the total cotton cloth production of the United Kingdom went to India, and over 45 per cent of the total Indian consumption of mill-made cotton cloth came from the United Kingdom. We have assumed that much of the rural idleness would disappear if people made all their own cloth instead of buying it from mills, whether foreign or Indian. If this be true, may we then say, with minor qualifications but without unfairness, that about one-third of the British textile workers were then supported

at the expense of the idleness of say 30 per cent of the Indian unemployed? That would mean according to the same authority, that 184,000 British workers were kept employed by keeping 32,000,000 Indian workers idle. As a matter of Empire engineering would such a procedure be advisable? Would any sensible factory manager keep one group of machines working if he discovered that that resulted in the idleness of a much larger number of machines in another part of the factory? His overhead costs would soon correct him.

The total annual earnings of these 184,000 British operatives, at 1925 wage rates, according to that Cotton Memorandum, would be about £ 17,700,000 or Rs. 230,000,000. But the 32,000,000 Indian idlers, if put to work for the period of their idleness, would, at 3 annas per day, earn Rs. 540,000,000.

Which group, then, represents probably the greatest potential market or the biggest potential purchasing power? If somehow a change could gradually be made in the work and product of the smaller group, or their product put to uses which would not create unemployment elsewhere, might not the result increase the prosperity of the Empire as a whole? Is not the short-time and under-employment which has prevailed in Lancashire for the last five years partly, at least, the result of the idleness and consequent decreased purchasing power of the Indian peasantry? Does not all this idleness represent a tremendous overhead expense burden on the entire Empire, and on the world?

Indeed, when the purchasing power concept is applied all over the world, it seems to be fairly clear

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that for one nation to try to keep its own people employed at the expense of people in any other country is a suicidal policy. It is merely robbing Peter to pay Paul, and presently Peter cannot buy Paul's goods and Paul, too, has to go idle and suffer. It cannot work in the long run. If one group suffers, all suffer. This would seem to show that those efforts will be wisest which tend gradually to allocate industries not so as to make immediately the most money for someone, but so as to keep all groups employed all the time all over the world. To attain such a result would probably require each country to be more self-supporting in respect to the two prime essentials of food and clothing than is the case at present. In respect to clothing, this process is already at work, as shown by the decline in world trade of manufactured cotton.

In respect to clothing, it is interesting to note that the entire cotton textile mill operative population of the whole world is estimated at only 3,500,000.* The reader may compare this figure with the millions of India and China who are able to make their own clothing and thereby increase their purchasing power for other things, *but at their own discretion*. The implications are interesting to ponder over.

There is a process which Westerners call "civilizing backward nations." It largely consists in inducing such nations to increase their wants and to buy manufactured products of the West. It may be said that in so far as this process results in a decreased utilization by such "backward" peoples of their own

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annual income of solar radiant energy, it is a dead loss to the world and a great economic mistake. Unemployment is apt to be a sign of that loss.

Viewed as a world problem, the idle groups of different nations constitute what may be called vacua and cause pressures and counter-pressures of no small import to national and international relations. The thwarted abilities, weaknesses, insecurities and fears of millions translate themselves into economic terms of competition for markets, purchasing power or its lack, productive power or its lack, world food supply, raw material supply, overhead expense burden, risk, gain and loss. They play their part in creating important conditions of public health, foci of disease, etc. In terms of social discontent, they become linked with matters of armies, navies and governmental stability.

So profound are its effects, that we may safely say that if unemployment could be really substantially and permanently decreased, the first country to succeed in so doing would be laying the foundations for the stability not only of its government but of its whole civilization.

Various causes have been ascribed for unemployment:—land monopoly or defective land tenure, fragmentation of land ownership, capitalism, commercialism, overpopulation, defective monetary systems, the trade cycle, unequal distribution of income or purchasing power, machinery, climate, etc. Probably all these factors play a part in the Indian situation.

Inasmuch as the original motive of Mr. Gandhi's

project was chiefly to relieve the existing unemployment and poverty, and he is constantly stressing its usefulness for that purpose, it will perhaps be desirable to examine his specific claims.

Certain of the above named causes of unemployment the khaddar movement does not attempt to touch. Obviously, land tenure is too massive a stronghold to win by any frontal attack. Nor can overpopulation be directly remedied. But the khaddar movement without any trace of socialism, does directly or indirectly reach most of the other causes of unemployment and tends to reform them in very fundamental fashion, and yet in a way that is wholly in harmony with the social and economic habits and mental attitudes of the great mass of the Indian people.

In modern machine-capitalistic industry the producer is so far from the consumer that there are inevitable periods of glut or scarcity and price variations. To that, add control of industry by financeers who know exceedingly little of engineering methods of production or of the real ways of living, needs and variations of needs of people outside their own class or neighbourhood, and who are more interested in making money than in making goods. Trouble is inevitable.

The charkha tends to eliminate both these difficulties. It puts the producer in the same house with or next door to the consumer. It needs no support from bankers. This cannot be said of any of the Western forms of relief.

Again, so far as mal-distribution of money income is a cause for unemployment, as urged by Mr. J. A. Hobson,

the charkha also diminishes that evil directly and substantially,—in the same ratio that expenditure for clothing bears to the total expenditure of the individual or family. In so far as the cotton plant has a different ripening period and growth habits from food plants, the khaddar programme helps to mitigate climatic causes for unemployment.

It is said to be a fallacy that machinery causes unemployment, and that in reality it provides work for more. That is true in countries where there is free and rapid development of fuel or hydraulic power. The increased use of power is essential to prevent unemployment following the introduction of machinery. The development of machinery very rapidly in the West and in Japan, and its relatively slow development in India has undoubtedly been a part cause of Indian unemployment.

The charkha and hand-loom directly provide one of the primary needs of all mankind. Cloth not only satisfies a necessity of the unemployed person and his family, but it also finds a market at almost all times. In India, the raw materials are grown in practically every district. The implements needed are exceedingly cheap and can be readily and quickly made in every village. The operating skill required can soon be learned, and is indeed already partly or wholly known by millions of people.

Hand-spinning, carding and ginning are types of work which are adapted for the relief of all kinds of unemployment, whether partial, temporary, or long-time, whether caused by famine, flood, physical disability

widowhood or other social condition, trade or financial depression, strikes or lockouts. They can soon be learned by anyone, no matter what his or her regular occupation. They can be done at home or elsewhere, singly or in groups. No special buildings are needed. The organisation required is not large or complex or expensive. It does not need legislation or other governmental aid. It can be rapidly put into operation on any scale needed.

Such work not only removes economic distress but also is of such a nature as to relieve the adverse mental and moral effects of unemployment. It is thoroughly self-respecting.

Not only does it claim these qualities and advantages, but it has actually proven them on numerous occasions under very difficult circumstances.

The charkha was successfully used in famine relief at Miri, near Ahmednagar, in 1920-21; in Kurnool District, Andhradesh, in 1922; in Coimbatore in 1924; in Atrai, North Bengal, in 1923-24; in Pudupalayam, Salem District, Tamil Nadu, in 1925; and in Utkal and Morattupalayam, Coimbatore District, 1925. Also for flood relief in South Kanara, 1924; Duadoreda, Hoogly District, Bengal, 1922; Rajshahi and Bogra Districts, North Bengal, 1922-23. Also by the cotton mill labour unions for relief of striking employees of Ahmedabad mills in 1923.* In all of these instances the work was done by voluntary organizations.

* See issues of *Young India* for May 11, 1921; Oct. 5, 1922; May 1 and June 5, 1924; June 4, Aug. 13, Dec. 3, Dec. 17, 1925. Also *Khadi Bulletins*, 1923, p. 73, publ. by All India Spinners' Association, Ahmedabad.

To make detailed comparisons would be difficult, but it may be stated with fair surety that such relief has been far less expensive in toto or per capita, more flexible and more permanently lasting in good results than any of the governmental forms of public works, unemployment insurance, or grants in aid which have been tried in Western countries.†

Although, on first thought, it might to a European seem fantastic, the author can see no reason why hand-spinning of either cotton, wool or flax might not be found to be the best form of unemployment relief in many other countries beside India. Probably it would be successful only on a small scale in the more industrialized countries because of misconceptions created by mechanized modes of living. But after all, even England and America gave up the spinning wheel and hand loom only about 140 years ago, and there are still villages in both those countries where such implements are used in a small way. In such countries it would be more work to make wheels, teach people, and provide materials, but it would perhaps be easier, more rapid, less expensive and probably more effective than the organization of governmental relief. It could be operated by labour unions or other voluntary organizations, as was done in Ahmedabad. And there would be none of the loss of morale, self-respect and self-reliance which does take place under governmental systems of money aid.

Dr. Harold H. Mann, the retiring Director of Agri-

† Compare information and figures in *The Third Winter of Unemployment*, P. S. King and Son, London, 1922.

culture of Bombay Presidency, in a recent interview to the *Times of India* (see issue of October 22nd, 1927) said in part:

"When asked what measures he would suggest for this great work of filling the empty stomachs of the people, Dr. Mann said that much could be done by the people themselves. They must put themselves to work, for no country could ever hope to be prosperous if the majority of its population were idle for six months of the year. The people must be given some work, no matter how small the income derived therefrom, during the dry season, and Dr. Mann said that no matter in what other way Mr. Gandhi had gone astray, he had penetrated into the secret of the poverty of India when he advocated the spinning wheel, no matter if it did produce only a few annas a day."

The author believes that Mr. Gandhi's scheme is the most effective, soundest, most fundamental and widely applicable plan for relief of unemployment that has been devised in any country. Its very simplicity baffles and often calls down the scorn of the Westerner who is used to complexity in every aspect of life. But here, as in several other departments of human activity and thought, perhaps "*Simplicitas sigillum veritatis.*"

Note. Some of the best books on unemployment are as follows: W. H. Beveridge - *Unemployment*, London, 1912; J. A. Hobson - *Economics of Unemployment* - Allen and Unwin, London, 1924; F. Geary - *Land Tenure and Unemployment*, - Allen and Unwin, London, 1925; A. C. Pigou - *Unemployment* - Home University Library Series; Rowntree and Lasker - *Unemployment: A Social Study* - London, 1911; F. C. Mills - *Contemporary Theories of Unem-*

employment and Unemployment Relief - U. S. A., 1917; A. Kitson - *Unemployment* - Cecil Palmer, London, 1921; G. D. H. Cole - *Unemployment, a Study Syllabus*, Labour Research Dept., London, *Third Winter of Unemployment* - P. S. King & Son London; *Waste in Industry* by a Committee of the Federated American Engineering Societies, Chap. XI, McGraw-Hill Book Co., New York, 1921; Stuart Chaso - *The Tragedy of Waste*, Chap. VIII, Macmillan, New York, 1926; Sidney Reeve - *Modern Economic Tendencies*, Ch. XX, E. P. Dutton & Co., New York, 1921; W. N. Polakov - *Mastering Power Production*, Chaps. 9 and 10, Engineering Magazine Co., New York 1921; *Business Cycles and Unemployment*, Report and Recommendations of a Committee of the President's Conference on Unemployment, McGraw-Hill Publ. Co., New York, 1922; F. W. Pethick. Lawrence - *Unemployment*, London; B. and S. Webb - *Prevention of Destitution*, London; H. Hart - *Fluctuations in Unemployment in Cities in the United States*, 1918.

CHAPTER VIII

SOME COTTON TECHNOLOGY

A large part of the khaddar being made today is coarse, heavy, and less durable than mill cloth. Yet it has greatly improved in regard to all these qualities since the beginning of the movement in 1921-22. This was clearly shown by samples of khaddar made in each of the past six years displayed at such exhibits as the National Congress at Cawnpore in 1925 and the South Indian Khaddar Exhibit at Bangalore in July, 1927. That is also the testimony of those who have worn it year after year. Three or four years ago the country-wide average count of charkha yarn was not over 8 or 10. Now it has improved to the fineness of 16. And it is to be remembered that relative coarseness and heaviness is not a drawback for the every day wear of the ordinary farmer.

Such defects are not inherent or unavoidable. The khaddar made before the advent of mill cloth was fine and very durable, both according to the testimony of many early travellers, and East India Company officials, as proved by the great demand for it in the former trade with Europe, and as appears from the samples in the multiple collections made by Dr. John Forbes Royle and Mr. Forbes Watson, now on exhibit in the Art Museum at Calcutta, The Royal Asiatic Society in Bombay, in London and presumably in Manchester.

An increasing amount of really fine and durable

khaddar is being made. Carefully spun charkha yarn has been tested by modern scientific textile testing apparatus by the Technical Department of the All India Spinners' Association and found fully equal to that made in the Ahmedabad mills.* Various experts have written of the durability of the modern khaddar.† Steady progress is being made all over the country.

It is difficult, however, for anyone acquainted with the great development of scientific textile technology in the West or who has never seen samples of really fine handmade cotton cloth to believe that it can possibly be as fine or durable as mill cloth. It may be desirable, therefore, to explain briefly some of the technical details about cotton fibre and processes of cloth manufacture which make such results possible.

By way of simplifying the discussion we may set aside the question of fineness of yarn. Yarn has been and now is being spun by hand in India up to 400 count.

The only questions are as to the comparative strength, uniformity, and elasticity of mill and hand-spun yarns of the same count, and the comparative durability of mill woven and hand woven fabrics of the same weight, as they are being made for actual use and trade. Here we are concerned not with quantity of production, but solely with quality.

* See *Young India*, August 19th 1926.

† I. G. Cumming *Review of the Industrial Position and Prospects in Bengal*, 1908, pp. 7-9; Bengal Secretariat Book Depot, Calcutta; H. H. Ghose *Advancement of Industry*, R. Combarry & Co., Calcutta, 1910, pp. 151, 153.

The consideration of quality begins with the nature of the tiny individual cotton fibre. A cotton fibre is a single elongated cell in the form of a flattened hollow cylinder or tube with very thin walls. It has a spiral twist, sometimes in one direction, sometimes in the other, often reversing its direction several times in the same fibre. The twists differ in tightness, length or extent. Often parts of the fibre have no twist. No two fibres are alike. Fibres even from the same seed differ in ripeness, length, flatness, thickness of walls, maximum and minimum diameters, smoothness, evenness, softness, suppleness, elasticity, strength, moisture and volatile oil content, and thickness of wax covering. Of course the variations in all these qualities between fibres from different seeds or bolls, fields or regions, or as between different varieties are still greater. The important thing to realize is that no two fibres are wholly alike.*

This fact is the basis of one great advantage which hand manufacture has over machine manufacture. In every process of hand operation the sensitive touch and sight and discriminating judgment and skill of the worker is present and able instantly to change and adapt itself and the working of the implements to the variations in the fibre.† A machine, however, is necessarily uniform in its action and cannot adapt itself to variations in the fibre. Of course the hand cannot

* See F. H. Bowman *Structure of Cotton Fibre*, Macmillan London, 1908; W. S. Taggart *Cotton Spinning* Vol. I, pp. 26-30, Macmillan, 1924; M. B. V. A. Talcherkar *The Charkha Yarn* publ., by the author, Bombay, 1925. See appendix E.

† Talcherkar, above cited.

adapt itself to variations between individual fibres, but to the larger variations it is more adaptable than machines.'

To get over this difficulty in the machine it is necessary to treat the fibre so as to obtain as much uniformity as possible preparatory to spinning. To this end the cotton for mill spinning must be cleaned, mixed, beaten, and drawn many, many times. The necessity for great output from the machines results in all these processes being done at high speed and with great force. Tremendous beater and roller speeds in power-ginning, enormous pressures in baling cotton, further violent, high-speed beating in the opening or blowing process, high-speed machine scutching and carding,—all these bruise, scrape, strain, cut and injure much of the fibre, and waste much of it, and decrease the elasticity, strength and "vitality" of what survives.* The corresponding hand processes are vastly more slow and gentle, and tend far more to preserve the valuable qualities of the fibre. This is perhaps especially true of Indian cotton in the ginning process, because its fibres cling more firmly to the seed than is the case with other varieties. Hence high-speed gins tend to injure and tear it more than other kinds of cotton.†

Durability of cloth does not result directly and solely from mere uniformity or evenness of fibre or

* See Talcherkar, above cited; Sir George Watt *Commercial Products of India* pp. 593, 611; W. H. Johnson *Cotton and its Production* Macmillan, London, 1926.

† W. H. Johnson *Cotton and its Production*, p. 140.

yarn. Yarn or weaving may be uniformly poor as well as uniformly good. Durability results rather from uniform strength, uniform pliability and uniform elasticity of yarn and uniformly close weaving. Let us consider these elements in turn.

"The strength of yarn does not depend upon the individual strength of cotton fibre but upon the number of twists and fineness in diameter of each individual fibre as well as upon the staple of the fibre.....The strength of a single thread of yarn will vary with the number of fibres in its cross-section."

"The object of the spinner is to produce the nearest approach to a perfectly cylindrical thread of equal diameter throughout its length, and containing at every point the same number of fibres in its cross-section as at any other points." *

"The strength which any yarn possesses depends not only upon the ultimate strength of the fibre of which it is composed, but also upon the degree of friction which the surfaces of the individual fibres possess, and which enable them to receive the twist of the yarn, and thus resist being drawn out when the thread is subjected to strain.....In the case of cotton, the friction is no doubt due to the twisted form assumed by the collapsed tubes." †

It seems probable that there is in mill processes a more uniform distribution of different kinds of fibres in

* Talcherkar *The Charkha Yarn*, above cited, pp. 18, 41, 46. In accord see W. S. Taggart *Cotton Spinning* above cited pp. 24-30.

† Bowman - *Structure of Cotton Fibre*, above cited, p. 275; also W. S. Taggart - *Cotton Spinning*.

the roving which goes to make the yarn than there is in the hand-made slivers from which most charkha yarn is spun. Yet as between Surat cotton (an Indian variety) and that of other countries, Dr. Bowman reports that Surat is most uniform in length of staple.* If this holds true also of other purely Indian varieties, it would tend to add to the strength of hand spun yarn of India as compared with that of any other country. Surat has also the strongest individual fibre, but its greater diameter offsets this, as it results in fewer separate fibres in any given diameter of yarn than there would be with the more slender fibres of other varieties. There is need for further research on these points.

Aside from devices to secure speed and volume of production, it might be said that the chief contribution of the West to cotton technology lies in an elaboration of certain of the processes between ginning and spinning (disregarding baling, opening, breaking, blowing and scutching). These processes,—known as carding, sometimes combing, drawing, slubbing, “intermediate”, and roving,—give great uniformity to the sliver or roving, ensure that all the fibres lie parallel, and give a preliminary, partial twist. All this adds much to the final uniformity and strength of the yarn.

A simple form of these processes was developed originally in India and is still practised there in certain localities. In the making of the finest Indian hand-spun yarn, as is done in parts of Madras Presidency, very great care is taken to comb out the separate fibres so that they lie practically parallel. They are not

* Bowman, p. 124.

rolled into the usual sliver or pooni form, but are placed between strips of plantain leaves and thence fed to the charkha spindle. It is possible that some such procedure was followed in former times in all parts of India.

To the author it seems probable that the further development of some such processes between carding and spinning might do more to improve the quality of khaddar than any improvement of charkhas or other implements now in use.

Western cotton and chemical technology has also greatly improved the dying process. Indian indigenous dyes are of excellent colours and variety, but do not seem to be capable of complete control as to shade, and most of them are not fast. It is hoped that further research now proceeding will remedy these defects.

Charkha yarn has other advantages which may offset the greater uniformity of fibre distribution in mill yarn. Since hand spun yarn has not been subjected to all the severe strains imposed on mill cotton, the individual fibres going into charkha yarn are doubtless stronger and more elastic than those of mill yarn. Charkha spinning, like mule spinning which makes the finest mill yarns, draws the thread out long and permits the twist to run into and strengthen the weak places, and promotes greater uniformity of twist than is possible with ring spinning in mills.* Again, in charkha spinning there is no electricity developed; whereas in mill processes the high speed and friction of cotton on metal and wood and leather parts often develops so much

* Bowman, p. 374; Talcherkar, pp. 9, 10, 42-43.

electricity that the cotton fibres repel each other and refuse to lie close and parallel while the slubbing or spinning is taking place.* If the individual fibres will not lie close and parallel during spinning, the yarn is weakened. Also the speed of the mill spindles, especially in ring-spinning, is so great that the centrifugal force on the fibres may tend to keep them further apart than on the slower charkha spindle.† Then they cannot lock well together and make strongest yarn.

Further, hand-processed cotton is usually given a longer period in storage for ripening and drying than is done in the case of mill cotton; and the cotton in the first case not being baled, the drying process is more thorough. Also, such cotton is always placed in the hot sunshine for an hour or more before being ginned. All this drying helps to give more twist to the individual fibres, and it is this twist which provides the friction and locking together of separate fibres upon which the strength of the yarn so largely depends. Dr. Bowman says :

“This peculiar characteristic twist, which is so marked in cultivated cotton, and which gives to it the necessary quality which enables it to be spun into a thread, which is impossible in the wild fibre, is not possessed by the fibre in its early stages, or indeed until it has been subjected to air and sunlight. The fibres taken from an unopened pod have no twist. They are always moist from imprisonment within the seed capsule, which is saturated with sappy juices and mucilage

* Bowman, pp. 240-241; Talcherkar, p. 21.

† Talcherkar, pp. 9, 10, 39.

and there is no tendency to dessication on the part of the fibre unless it is placed in a dry position. The twist only appears after the fibre, which reaches the full length in the boll, or almost so, is exposed to dessication.....This peculiarity seems to manifest itself very shortly after the opening of the boll, and to be increased by the gradual accumulation of secondary deposits and the collapsing and dessication of the fibre after the separation from the seed.”*

There is one more peculiarity of Surat cotton which may tend to add strength to yarn made from it; and if this peculiarity is also found in other varieties of Indian cotton, it would be another factor of strength for charkha yarn. In Dr. Bowman's book, at page 118, there is given a table of the maximum, minimum and average number of convolutions in the individual fibres of five different kinds of cotton, - Sea Island, Egyptian, Brazilian, American (Orleans), and Indian (Surat), taking fifty samples of each. By deduction from these figures it appears that the range between maximum and minimum is least with Surat. The range figures are:—Sea Island 120, Egyptian 105, Brazilian 102, American 96, Surat 70. This would mean a greater uniformity of twist in the Surat fibre, and thereby help toward greater uniformity of yarn, with whatever strength that uniformity may bring.

Whether or not the processes preparatory to hand spinning tend to create more reversals of twist in individual fibres, we do not know. Such reversals of twist would increase the strength of the yarn. Dr. Bowman

* *Structure of Cotton Fibre*, pp. 116, 275.

says, as to this : (p. 118 of his book) :—"It may be noticed that this reversion of twist is an additional advantage in cotton spinning, because it increases the locking action of the fibres when the twist is put in, as they are analogous to the holding power of a combined right and left-handed screw, and so hold in whichever direction the torsion comes."

The property of elasticity in yarn depends partly on the elasticity of the individual fibre and partly on the ratio of number of twists per inch in the yarn to its diameter. The gentler preparatory processes for hand spinning tend to leave greater elasticity in the fibre. Charkha spinning, like mule spinning, secures better conditions for twist than ring spinning, and the presence of the delicate touch and "feel" and discrimination of the hand spinner probably makes possible the attainment of more elasticity of yarn on the charkha than even on the mill mule spinning machine.

Pliability of yarn may be greater where it is hand made than mill made, largely because of slower and gentler preparatory processes preliminary to hand spinning.

All these considerations are not inconsistent with the fact that much of the khaddar now being made is less durable than mill cloth. They simply indicate perhaps some of the reasons why the khaddar of former times was so very fine and strong, and that it is possible even now to make superior khaddar. These technical details have not yet been fully taken advantage of, but when they are we may find superior khaddar all over India.

In the processes between spinning and weaving the hand methods have some further advantages over machine methods. Mr. H. H. Ghose explains this in his above referred to book, *The advancement of Industry*, at p. 158. He says,

"The aforesaid methods show that the indigenous weaver sizes his yarn previous to warping it, which is a more efficient system of yarn preparation than the reverse method followed in the power industry. Sized yarn possesses strength sufficient to resist the stretching and breakage which it is subjected to in the warping process; but unsized yarn gets its elasticity drawn upon in the warping process and breaks by the slightest undue strain in the loom. In the power industry, sizing is never done before warping, as to make the former process expeditious many strands of yarn are sized together, and when a large number of threads are to be arranged as a preparatory process to sizing, it is more economical to warp them than to merely arrange them. But it is this warping of unsized yarn that destroys a portion of its strength."

He further describes (p. 154) a method of single thread sizing used for certain cloths in Bengal, which though slow produces cloth of superior durability.

Again, Mr. Amalsad, in his pamphlet above cited, says in regard to the greater durability claimed for hand made fabrics.

"May it not be attributed to larger percentage of stretch left in the yarn during hand weaving and to the closer beat-up of the wet weft?"

In the present stage of only partial recovery of the old Indian art and technical processes of cotton cloth manufacture, not all of the above described qualities of the fibre and the processes have as yet been fully utilized and taken advantage of. This point is deliberately repeated because of the depth of our prejudices in favour of machinery. Steady improvements in khaddar are taking place, and the machines may yet have to look to their laurels.

It is now perhaps apparent that Indian hand processes have certain technical advantages which machine processes lack, and which may be and probably are, when fully utilized, sufficient to counterbalance the advantages of machine processes. It is really not surprising that this should be so, for cotton cloth has been made in India since the dawn of history. Indians are a sensitive and keenly observant people, attentive to detail and given to profound thought. These thousands of years of experience have afforded a wealth of experiment which no modern scientific laboratory can equal. True, the process of observation and induction was slower than in modern laboratories, but the process was essentially the same as that of modern scientific research. Much of that knowledge has been lost, but much has been and further can be recovered. There is still much room for invention and discovery of improvements at every stage of manufacture. Experiment, training and determination are all present, active and growing. It is quite possible that modern hand processes of making cloth in India may prove on a wide scale qualitatively superior to power-machine technique. And if so, the result will

enrich the meaning and applications of science, increase our human tolerance, and improve our sense of proportion.

CHAPTER IX

DOES IT WORK ?

One of the tests of the soundness of any economic movement is its ability to survive and grow in the midst of conflicting forces. The khaddar movement meets that test. And the foregoing chapters indicate good reasons for believing that it will carry on and grow regardless of the coming or going of any particular personalities connected with it. Its vitality is further indicated by comparing its growth with that of other somewhat similar privately organized and supported enterprises. We may fairly compare it with the early cooperative movement in England and the cotton mills in India. Comparison with the cooperative movement in India would not be fair, because that was initiated by Government and has received strong and constant legislative, financial and administrative support from both Central and Provincial Governments. Comparisons with other revivals of earlier activities, such as Danish or Irish agriculture or Swedish hand weaving, would be instructive, but we do not possess the necessary information.

As for early cooperation in England, Robert Owen's first Cooperative Society was started in 1821. Nine years later there were 250 such societies. Then the number dwindled for a few years, before its later upward course. The Rochdale distributive store began in 1844

with 28 members. Twenty years later, in 1864, such stores had increased their membership to 4747.

The first Indian cotton mill was started in Calcutta in 1838. The next was established 15 years later, in 1853, at Bombay, with 5000 spindles. By 1875 there were 48 cotton mills in India.

The khaddar movement started in 1920. In *Young India* for March 7, 1927, Mr. Gandhi stated, " It did last year at least twenty times as much work as during 1920. It is now serving not less than 50,000 spinners in 1500 villages, besides weavers, washermen, printers, dyers and tailors." With this it is to be remembered that it has lost the political enthusiasm and support which it had in its first two years.

This comparison is certainly favourable to the khaddar movement.

Of course even before the movement started very many peasants were accustomed to spin and weave their own yarn and cloth.

The following figures furnished by the All India Spinners' Association illustrate further details of the growth and present status of the movement. The figures do not include the work of several khadi production and sales organizations, some large and some small, which are not affiliated to the A.I.S.A.

It is unfortunate that the figures of production and sale are not given in square yards or pounds of cloth as well as in rupees. Price fluctuations prevent the rupee figures from showing the real growth.

TOTAL PRODUCTION OF KHADI IN ALL PROVINCES
(Expressed in Rupee values)

Months	1927	1926	1925	1924
January	137,926	184,067	..	Monthly figures not available
February	168,620	160,068	..	
March	193,532	152,445	..	
April	164,473	144,742	..	
May	179,976	158,941		
June	189,170	132,204		
July	229,493	203,520	Total up to September	
August	233,385	195,195		
September	224,839	213,732	19,030,34	
October	242,369	198,338	188,579	
November	203,666	172,268	186,085	
December	178,165	171,483	234,812	
Total.	2,345,614	2,087,003	2,512,510	949,348

No accurate figures are available for earlier years.

TOTAL SALES OF KHADI IN ALL PROVINCES
(Expressed in Rupee values)

Months	1927	1926	1925	1924
January	277,261	245,709	...	Monthly figures not available
February	239,054	232,839	...	
March	307,326	245,634	..	
April	314,162	272,373	..	
May	274,322	228,889	..	
June	286,206	231,516	Total up to September	
July	242,269	235,169		
August	261,164	177,298		
September	338,100	250,123		
October	323,112	338,253	212,994	
November	245,342	260,618	214,982	
December	282,456	259,814	314,805	
Total.	3,370,774	29,222,75	41,038,42*	1,916,411*

* These figures involve considerable duplication. No accurate figures are available for earlier years.

SALE DEPOTS

Provinces	In cities	In towns	In villages
Andhra	9	10	17
Ajmer	2	2	4
Behar	10	12	6
Bengal	17	23	10
Bombay	2	—	—
Burma	1	—	—
C. P. Hindi	2	—	—
Delhi	1	1	—
Karnatak	6	14	4
Kerala	1	3	—
Maharashtra	8	10	2
Punjab	10	8	—
Tamil Nad	11	24	17
United Provinces	7	5	—
Utkal	4	1	3
Gujarat	4	5	11
Total	95	118	74

"Besides these there are several hawkers who sell khadi on commission in cities as well as in villages, especially in the provinces of Andhra and Tamil Nad. There are several hawkers who sell khadi on their own account."

PRODUCTION CENTRES.

Ajmer	...	7
Andhra	...	33
Behar	. .	9
Bengal	...	17
Bombay	...	1
Burma	. .	—
C. P. Hindi	...	—
Delhi	...	1
Karnatak	...	7
Kerala	...	1
Maharashtra	...	8
Punjab	...	6
Tamil Nad	...	29
United Provinces	...	5
Utkal	...	4
Gujarat	...	18
Total	...	<u>146</u>

The number of villages served by these centres will possibly go to several thousands."

LIST OF TOTAL NUMBER OF WORKERS SUPPORTED
BY THE A. I. S. A.

Provinces.	Staff	Spinners	Carders	Weavers
Ajmer	11	x	x	x
Andhra	40	756 y	23 y	132 y
Bohar	x	15000	—	—
Bengal	179	21461	—	1067
Bombay	10	x	x	x
Burma	4	x	x	x
Gujarat	47	2065	49	194
Karnatak	29	410 y	10 y	55 y
Kerala	x	100	—	10
Maharashtra	40	325 z	12 z	25 z
Punjab	33	3000	—	300
Tamil Nad	65	14044	—	1581
United Provinces	24	x	x	x
Utkul	31	798	16	43
Total	513	57959	110	3407

x Not reported.

y For three centres only.

z For one centre only.

" Besides these there are many voluntary workers in different places in different capacities."

DOES IT WORK ?

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CHARKHA SPINNING
IN MUNICIPAL OR DISTRICT BOARD SCHOOLS

Province	Name of Municipal or District Board.	Number of schools in which spinning is introduced.	Girls who are learning spinning.	Boys who are learning spinning.	When spinning was introduced.
Andhra	Tirupati	9	100	76	1926
"	Nellore	10	100	—	1927
"	Guntur	35	—	—	1926
"	Berhampore	—	—	54	1926
"	Bhimavaram	40	—	200	—
"	Bezwada	27	—	194	—
Behar	Champanan	420	—	—	1926
"	Shahabad	8	—	139	1926
Tamil Nad	Madras	1	—	100	1927
United Provinces	Lucknow	15	108	41	1926
"	Benares	34	—	—	1926
"	Allahabad	38	500	1638	1926
"	Basti	1	—	15	1926
Utkal	Sambalpore	—	—	70	1926
Total		638	808	2527	—

Boys and girls not listed separately,
in Guntur, Champanan and Benares 2898
Total boys and girls 6233

The number or place of schools where spinning on the takli or simple hand spindle is being taught does not seem to be known.

Yarn testing by modern scientific apparatus like that used in Europe and America is established in ten or more production centres, and definite rules for yarn testing have been promulgated by the Technical Department of the All India Spinners' Association. The Association has also in operation at Sabarmati a three years course of training in almost all the technical processes of Khaddar manufacture, and in dyeing, accounting, organization and the other work necessary for the operation of production and sales centres. For several years past there has been a somewhat similar course at Sabarmati, though not so well organized. At several other places training is given in these subjects, also in printing cloth.

There is an Information Bureau of the Association, which publishes both technical and general bulletins and books. Every year at the Indian National Congress meeting there is a khadi exhibition. Numerous provincial exhibitions have also been held.

According to the annual report of the Association for 1925-26, there were 3472 "A Class" members of the Association and 942 "B Class" members, a total of 4414. These are all voluntary spinners whose yarn is not sold but donated to the Association by way of interest and support. Both classes of members are pledged to wear khaddar habitually and have the duty of carrying on propaganda for hand spinning and khaddar. "A Class" members spin 1000 yards of yarn per month, while "B

Class " members spin 2000 yards per year. There is also a " Juvenile Class " of members, under 18 years of age, numbering 185, who also wear khaddar habitually and contribute 1000 yards of selfspun yarn per month.

Further information as to progress may be found in the annual reports of the Secretary of the Association, publications issued by the Information Bureau, publications of various Provincial Khadi Boards or production centres, and in the files of Mr. Gandhi's paper, *Young India*, published from Ahmedabad. A list of many of these is given in Appendix D.

Of course it will require much more educational work and organization before the programme is a permanent success. When so many millions of people have formed habits of enforced idleness for several generations, and have suffered so severely from such diseases as malaria, kala azar and hook-worm, it is not easy to arouse hope, ambition, initiative and energy in them. Nevertheless, the growth to date is healthy and promises a satisfactory future.

CHAPTER X

VARIOUS OBJECTIONS

An oft-voiced objection to the khaddar movement is that the wages which spinners can earn are so microscopic that, as an occupation, spinning cannot attract a sufficient number of people to make it an economic success. It may do, they say, for widows and some other unemployed or underemployed village girls or women, but for no others.

The major answer to this, as Mr. Gandhi has so often reiterated, * is that the charkha is not proposed as a full time occupation, but as a part-time job during portions of any day or season when there is spare time. Used in this way in South Indian villages, it has shown itself able to supply from 15% to 66% of family incomes.†

The wage objection may hold true at present to a certain extent in certain districts, but it will have less and less weight as improvements are made in the efficiency of the charkha and other implements.

This objection is connected with the proposal that hand weaving is more remunerative than hand spinning and that therefore weaving should be encouraged rather than spinning. Mr. Gandhi's answer is best, as given in Appendix A. The correctness of his judgment is verified by the fact that endeavours by Governmental

* See Appendix A.

† *Young India* for Aug. 13 and Sept. 10, 1925.

departments in many districts to stimulate cottage weaving, have as a whole not grown or prospered.

To other minds the prime defect of the scheme is that it is apparently a rejection of all modern science and machinery, a blind and impossible atavism, a false asceticism. This objection has been partly answered already in Chapters I and II, but some other elements of it may be discussed here.

We sometimes forget that science and technique are not concerned primarily with size or appearance. There is as much science in studying the atom as in studying an ocean steamship. The watchmaker or spider have as fine a technique as the boilermaker or the bridge-builder. The smallness and relative simplicity of the charkha or the slightness of power required for its use do not make it unscientific. Size and simplicity are only relative terms. Many users of the charkha may, and the technicians of the movement should, have as much scientific knowledge of cotton fibre as the most advanced technicians of England, Germany, Japan or the United States.

Instead of being a rejection of science, the khaddar programme is a very wise application to economics of what is known to scientists as the Second Law of Thermodynamics. The hand-gin, carding bow, charkha, and hand-loom are simple machines, better adapted than any others to existing Indian conditions. Lovers of the antique may prefer coal to daily sunshine, but there is nothing more *scientific* in the use of coal, as ancient, stored-up solar energy, than in the use of food and bodily force as the present annual income of that energy.

We must not confuse science with technology, nor with concentration of power. Science applies to all forms and degrees of power and to all modes of technology.

In our admiration for the steam engine and dynamo and machinery in general we must not forget the wonderful efficiency of the human body. After all, we did not make the power that resides in coal and oil. An engineer who builds a hydraulic power generating station need not feel any more proud of using water stored in a reservoir than of using the current flow, as at Niagara. So also with the stored and current flow of solar energy. Great size, quantity and speed are doubtless impressive and oft-times admirable, but they are a bit like a very loud noise. We must not fall into the error of the savage and allow ourselves to be overawed or confused or thrown off our balance by them. The human mind and spirit are more important.

The khaddar movement is more and more using modern science and technology, but applying them to a different mode of power utilization and to a different type of machinery from that found in Western industrialism.

Of course these hand-operated implements may be used lazily or stupidly, simply because of settled custom or out of mistaken reverence for the past. But they also may be used with the most acute and profound modern scientific knowledge and an admirable technique. Just because they were ancient, the usages of our forefathers were not necessarily good, nor were they, on the other hand, necessarily bad or unscientific.

Professor Soddy, himself a brilliant scientist,

says *: "From the energetic standpoint progress may be regarded as a successive mastery and control over sources of energy ever nearer the original source....." "It has been known for nearly a century, but the implications of the knowledge are often forgotten, that, with few and economically unimportant exceptions, the whole of the energy that makes the world a going concern comes from the sun."

"Wealth...is essentially the product of useful or available energy.".....

"Although, to everyone except an engineer or a physicist, energy seems to be quite a minor item in the production of wealth, if we concern ourselves with what is used up in the process of creating wealth, it is the largest and most important item."†

"Much of this, of course, if not its implications, is well understood to apply by the specialist, though usually the source of wealth is not quite traced back as far as the physical energy of sunshine. But long ages of penury and subjection, to one form of injurious domination or another, have accustomed people to look upon wealth as something which like gold, is essentially limited in amount, so that, if some get much, others must go short to make up the balance, rather than a quantity which scientific advances have made capable of almost indefinite expansion. None of the world's real problems

* *Wealth, Virtual Wealth and Debt*, above cited, pp. 37, 48, 57-58,

† Modern scientists consider matter as only one form of energy

center today around the mere provision of wealth. The difficulties arise rather in getting rid of even a small part of what can be made, without fighting for the privilege of either making or selling it. But to people who think of wealth not in terms of energy and human endeavour, but in terms of money tokens, there seems to be nothing incongruous in the continuance of the acute economic suffering into which Europe has been plunged, nor any evidence of failure in the most elementary function of government in the spectacle of unemployment and poverty at one and the same time."

It is true that Mr. Gandhi has said some severe things about machinery and modern industrial civilization. But careful analysis shows that his real objection is to the use to which they have been put, rather than to the things themselves, however closely the two aspects may be interwoven. *

If capitalism † could be removed from the world and be replaced by the motive of service, as it was with so many people during the Great War, much machinery would automatically disappear and many of the evils of Western civilization along with it. After all, Mr. Gandhi's position is not so far removed from

* See Appendix E on Limitation of Machinery.

† Cf. Mr. Keynes, the distinguished British economist in his booklet, *The End of Laissez Faire* Hogarth Press, London, 1926, p. 50, "What seems to me the essential characteristic of Capitalism, namely the dependence upon an intense appeal to the money-making and money-loving instincts of individuals as the main motive force of the economic machine."

the doubts of many thoughtful engineers, scientists and historians who feel that science is being distorted and used for the satisfaction of harmful motives.*

India can well afford to postpone a thoroughgoing adoption of machinery at least until she has got a clearer knowledge of the implications of both machinery and industrialism, and until she has wrought various changes in her organization and certain disciplines. By waiting, it might be possible to select and utilize some of the good features of Western civilization without having to wade through all its evils. And perhaps a very little machinery may suffice, provided other difficulties are cleared out of the way.

As to the accusation of asceticism, most people forget that the original meaning of the word was the training which a Greek athlete underwent, a dropping of unessential luxuries in order to win a race. It is possible that such a concept of the term may be applied to the Indian situation usefully and without any apologetics.

Closely allied to this charge of rejection of Western culture is the more philosophical objection to the scheme as being merely a manifestation of Mr. Gandhi's ideas of non-co-operation. The opponents object to non-co-operation because it is essentially negative in character and therefore can never be the basis for a great national renaissance.

History indicates that almost all instances of

* See the writings of F. Soddy, W. N. Polokov, Count Korzybski, Bertrand Russell, H. G. Wells, Trevelyan and others.

national or racial cultural progress have come from contact and organic fusion and inter-fertilization of two or more prior cultures. May not the present situation in India be exactly that process? May not the non-cooperation idea be a negative statement of what is in essence a positive process; namely the *selection* by the members of one culture of certain elements of the other culture which can be truly assimilated and made an organic part of a new growth of spiritual, moral and mental elements entering into a civilization now in process of reformation? In such an aspect, non-cooperation, instead of a negative or ill-natured rejection or assertion of absolute right or wrong, becomes an expression of *preference* for the sake of wisest adaptation to an existing environment and tradition. The apparently negative phraseology or action is only a reflex from the existing political and economic circumstances, and may not be the real heart of the movement.

By analogy, healthy physiological processes involve a constant metabolism and katabolism, a rejection and assimilation. Rejection is all right provided that there is at the same time an acceptance of something else that is more fitting or useful. This dual process is only putting each thing in its most fitting and useful place. What is waste and poison for me is useful to plants, who in return give me something more useful to my form of life.

This two sided activity enters even into aesthetic creation. "The creative process is a process of exclusion to the same extent that it is a process of inclusion. In this connection 'to exclude' means to relegate to irrele-

vance in the aesthetic unity, and 'to include' means to elicit relevance to that unity." *

Again, we must not let the newness of an action or the size of the factors involved confuse us. For instance, if we see a mill manager or a European declining to buy khaddar, or an artist refusing to purchase a picture whose colour or lines do not suit him, we do not characterize the actions as "negative" or "stultifying" or harmful. The khaddar movement is young and, compared with industrialism, rather small; but that does not necessarily prove that the rejections involved in it are purely negative. The spirit and purpose count more than the form of the act.

Another group of critics condemn the khaddar movement as being morally inconsistent with Mr. Gandhi's professions of love for all mankind. They point out that the displacement of all foreign cloth by khaddar would mean terrible unemployment and suffering in Lancashire and Japan, and a moral as well as economic separation and opposition between India and other countries. They say that Mr. Gandhi, in his eagerness to help the masses of India, is willing to injure the labouring masses as well as the manufacturers of other countries.

These critics overlook two points. They assume that the existing industrial and financial system of the West can and ought to continue to function without modification. Also they forget that khaddar cannot come at a bound. Its slowness of growth will leave

*A. N. Whitehead, *Religion in the Making*, Macmillan, New York, 1926, p. 113.

time for capitalists to shift their investments, for trade in different goods and in different directions to be developed, for economic readjustments of many sorts, for new international and industrial relations to grow up. Present difficulties in Lancashire seem to be due more to the inflation of capitalization just after the war, the development of rayon and other artificial silks, the continued operation of inefficient units, and the Chinese boycott, than to the decreased demand from India.*

The situation is too complex to predict any future development with sureness. But we may be sure that sound economics will be sound for all nations and individuals at the same time, none suffering because of prosperity of others.

The Indian, Lancashire and Japanese mill interests or their friends need not look upon the khaddar programme with hostility or anxiety. It is only a part, but an inevitable part, of a general change in the cotton trade and manufacturing industry all over the world, as shown in the last part of Chapter IV.

The railroads have not lost by the advent of automobiles, motor trucks and airplanes. It has meant simply more specialization in different kinds of service and at the same time a growth in the absolute total.

This is also the answer to the fears of the cotton mill interests. The total increase all over the world in the effective utilization of solar energy, stored or current, and the consequent increases in purchasing

* See Memo, on Cotton for International Econ. Conf. The article on Cotton in 12th ed. of *Encycl. Brit.* and article on Lancashire situation in the *Nation and Athenaeum* Nov. 13, 1926.

power of all countries will tend to provide the mills with markets for some sort of goods. For example, more prosperous farmers would mean more grain and sacks and bags to hold it,—hence a demand for cloth for the sacks. The problem is one of adaptation and specialization for greatest and most enduring service,—not how to crowd out hand implements or one another.

This process of specialization need not mean economic or other kinds of isolation or barriers. Rather, by lessening exploitation, it will tend to promote mutual trust and respect. For anyone to fear that economic self-reliance in the prime essentials of life,—food, clothing and housing,—will result in isolation seems to betoken an assumption that there is only a limited amount of materials, products, ideas and ideals which can be shared. That is not true of either individuals or nations.

To the author, the developments in India appear to be only a part of the growth of a whole new world order. To condemn Mr. Gandhi personally for his great part in it seems to evince a lack of appreciation that history is not mere static architecture built up in the past, but a present working process acting through groups and individuals. Whatever mistakes have been made by Western civilization will have to be paid for by the sufferings of its peoples, regardless of Mr. Gandhi and khaddar.

Moreover, as suggested in the chapter on Unemployment, the khaddar idea is a gift also to the West and may be utilized by its unemployed people in their own countries, spinning wool and flax, for their own use

and for sale. Many Western farmers also are not prosperous and not always busy, and might well be able to reduce their expenses by maintaining a few sheep and providing their own cloth. In the West, transportation and sales, the distributive part of the economic process,—are steadily increasing their proportionate share in the total costs of all articles. The farmers feel this as a constantly mounting burden. This being so, co-operative movements can act only as mitigations of the cost of living. But if farmers, for instance, could escape from the web of capitalistic industry in respect to certain prime essentials, as by manufacturing their own clothing and growing their own food, the relief would perhaps be greater, more easily attained, and more subject to individual control.* No one can fairly accuse Mr. Gandhi of being blind to the sufferings of peoples of other nations.

Another aspect of the international situation is the matter of emigration. If Oriental emigration to other lands is to be restricted, then the Orient must utilize its natural resources and "surplus" population to the utmost where they are. For Europeans and Americans to exclude Indians from various territories and yet ridicule them when they attempt in their own way (e.g. the charkha) to make a living in India is inconsistent. Full use of India's solar energy will go far towards relieving her excess population problem, and thereby help to remove certain causes of international friction.

An objection to khaddar felt by certain of the

* See S. A. Reeves—*Modern Economic Tendencies* E. P. Dutton, New York, 1917.

middle classes, especially those who have large families or who live in the cities, is the extra expense growing out of its texture. They point out that its roughness causes it to soil more quickly than mill cloth. Their standards of living require clean appearance of clothing at all times. Hence, washing must be more frequent, with corresponding increase of wear on the cloth and larger washing bills, or more servants to do the washing. The heaviness of the cloth makes it dry more slowly, especially during the rainy season. So one must have more clothes to provide for the delay. The thickness of the cloth uses up more soap in the washing and thus increases the expense. Again, if the cloth is dyed, the thickness of its texture causes it to absorb from two to three times more dye than lighter weight fabrics, thus increasing that expense also.

These difficulties are real and practical. They will not be met by asking such people to alter their standards of living. A very, very few may do so, but the majority will refuse and will simply be alienated from the movement by such a demand. Such difficulties will be met only as improvements of technique and organization are made which will provide lighter weight and more durable khadi at cheaper prices. While that improvement is taking place the situation offers an opportunity for such khadi centres as can now supply cheap light weight durable khadi to help both themselves and the movement by wider advertising of their stocks, especially in cities. At the same time, it is to be realized that these are not objections which seriously affect the vast mass of village people. Yet to the extent that the co-

operation and assistance of middle-class people is desired, efforts ought to be made to meet these objections promptly.

Still other critics maintain that it is economically wrong to ask people to buy khaddar when it is necessary to pay for it a higher price than for mill cloth. But the situation may be compared to that of the citizen of the United States who paid extra prices for iron and steel because his government imposed a customs tariff on such goods in order to "protect the infant industry" of the U.S. Steel Corporation. On the whole it seems as economically sound to pay a (cloth) tax in order to help revive an ancient industry which directly supplies a prime necessity of every person, and is capable of developing and distributing equably the real wealth of the country contained in its solar power, as it is to pay a governmental tax to help develop a relatively new industry whose products are not a prime necessity and whose profits and control are mostly in the hands of relatively few. The khaddar programme is a large scale effort to correct a national mistake, and it needs the assistance of all Indians.

The last objection to be touched upon is that for ages in India spinning has been an occupation only of women, and that men consider it effeminate and undignified, and that therefore they cannot easily be induced to take it up. To a considerable extent this is true. But among shepherds, in both the plains and hills of India, men regularly spin. The tremendous moral influence of Mr. Gandhi has been and will continue to be a powerful solvent of such old prejudices. If large

numbers of the middle class and intelligentsia could learn to see the matter in a clearer light, their example would reinforce that of Mr. Gandhi.

Possibly some of the considerations set forth in this book may help toward a reconsideration of certain ideas of this sort. Manual labour, regarded as a mode of transformation of solar energy, is as dignified and fine a kind of work as that of a superintendent or engineer of a power house or factory. They are really only different modes of the same operation. The manual labourer has more to do with the actual creation of the physical power he uses and directs than the engineer has with the power which he uses and directs. The manual labourer, therefore, has perhaps even better ground for pride in his accomplishments than the engineer has for his.

It does not seem any more weak or undignified for a farmer to transform solar energy into cloth than into rice or dal or wheat. A farmer going to a mill town for work willingly takes a job in the spinning department of a cotton mill. Why not at home? Sheer prejudice. The hope of undermining it is stronger now than it used to be. And as for educated middle-class young men, if they have any imagination, the organization of the use of the sun-power of India is as mighty and thrilling a task as can be found anywhere in the world.

Of course the movement, like all others in the world, has its exaggerations, absurdities and mistakes. But these have been sufficiently played upon by the scoffers, so as not to require elaboration here. They do not affect its essential validity.

CHAPTER XI

COMPARISON OF CHARKHA PROGRAMME WITH OTHER REFORM SCHEMES

Naturally, in a country so large as India and with so many and such complex social and economic problems, there are many schemes of reform and improvement, both in operation and on paper only. Their advocates are active, devoted and enthusiastic, and great good is being accomplished in many directions. The ferment of thought and activity betoken a renaissance similar to that which is taking place in many other parts of Asia.

While not decrying or wishing to detract from the efforts or accomplishments of a single one of these reforms, there seem to me to be certain advantages which the charkha movement possesses which deserve to be set forth in any careful examination of its validity.

Inasmuch as India is primarily an agricultural country, agricultural reform and improvement naturally receives first consideration by most people. India cannot be truly prosperous until her agriculture improves. Undoubtedly, it is less productive and more hampered than that of many countries. * As perhaps

* Yet see *Intensive Farming in India* by John Kenny, formerly Director of Agriculture, Hyderabad, Deccan, Higginbothams, Ltd., Madras, 1922, p. 18; *Report on the Improvement of Indian Agriculture*, 1889, by Dr. Voelcker, Consulting Chemist to the Royal Agricultural Society of England, Eyre and Spottiswood, 1893, London; and

the greatest user of solar energy, agriculture is of enormous importance to every country.

There are various schemes of agricultural reform; co-operative agricultural loan organizations, farmer's co-operatives for all kinds of production and sale, co-operatives for amalgamation and redistribution of fragmented areas, irrigation works, cow breeding or cow protection associations, governmental agricultural education, etc.

Most of these are outgrowths of European conditions and experience, and call for forms of organization and methods of work and control which are new and foreign and difficult for Indian peasants to grasp and master. Most of them require special legislation or governmental financial or administrative aid. It is pointed out in *India in 1925-26** (p.152) that co-operative societies seem to have had greater difficulties in developing and carrying on in those provinces where the land tenure of the cultivators is on a rental basis (Bihar, U.P., C.P., Bengal) than where the working farmer is a land owner (Punjab, Madras, Bombay). This is said to be because in the first named conditions tenants cannot give what is considered adequate security for loans. The khaddar movement has no such handicap. It is more simple and fundamental than legal rules for security of

* Edited by J. Costman, Director of Public Information, Government of India, Government Central Publication Branch, Calcutta.

Evidence of Dr. Wallick, Superintendent of East India Company's Botanical Garden at Calcutta, Aug. 13, 1832, before a Select Committee of the House of Commons (Vol. II, Part I, p. 195, of the Report thereof).

money lenders. It is actually stronger in Bengal and Bihar than in the Punjab or Bombay.

Irrigation works are exceedingly expensive and require months and years in construction before they become useful. Such characteristics delay and limit the usefulness of these projects in helping those who most need the help.

Consolidation of fragmented land holdings is slow, very complex, full of possibilities of injustice, hardship and discord, and usually requires special legislation. Its complexities are greater than they would be in the West because of survivals of the joint family system, the prevalence of heavy debt, and in certain instances various caste rules.

Although Mr. Gandhi stresses the use of the charkha ahead of agricultural reform, he is not blind or inactive as to the need of the latter. The three great agricultural needs in India are more water, better cattle and more manure. Mr. Gandhi is actively promoting two of these. He has provided for the manufacture and sale practically at cost of a very simple, ingenious and effective water-lift to be applied to wells and operated by bullocks or buffaloes. He is also acting as president of the All India Cow Protection Association, and through that organization stimulating the adoption of best methods of dairying, use of hides, selection, breeding, feeding and care of cattle, all by methods adapted to Indian conditions, beliefs and customs.

The khaddar programme, like the co-operative movement, involves a change in consumer's demand, but it differs in that it changes both the scale and nature of

demand and the scale, nature and organization of production and supply also. Thus it improves the conditions and results of both production and distribution more fundamentally than does the co-operative movement. Details as to this are set forth in Chapters I and VIII.

Practically all forms of social and economic organization, in order to be successful, have to be indigenous to the civilization in which they are to grow. The khaddar movement, in spirit, method and tradition, is indigenous to India, and therefore has a great advantage over all reforms of Western origin.

Another sort of reform advocated is the adoption of modern power-driven machinery, that is, the industrialization of India as rapidly as possible. This might take the form of large city mills and factories or small "cottage" electrically-driven units of machinery. But to carry this scheme through on any considerable scale is slow business, would take vast amounts of capital, with accompanying foreign control and drains of interest, and would bring in its train social handicaps and difficulties from which all who care for the Indian people shrink. Perhaps India will yield to the pressure of industrialism; but if it must come, it would be better to have it come gradually and let the mass of the people grow slowly into the new forms of social life and discipline. As we have already pointed out, the charkha is a machine and sunshine is a greater power resource than fuel. To use it is not backward and unprogressive, but the wisest step forward. What is most needed in India today is not more and expensive factories and

mills, but the simplest and quickest utilization of the existing idle man-power.

"Cottage industries" are strongly backed by many. Usually government aid is requested for them. The name, as generally understood, applies mostly to the manufacture in the home, of articles of luxury or for which the demand is very limited. Obviously the khaddar programme is superior because of this fact. To those who urge the promotion of hand-weaving as a supplemental occupation, the answer is given by Mr. Gandhi in Appendix A.

Technical education is proposed, chiefly engineering and agriculture. But why educate boys to be engineers before there is a wide and steady need for their services? And those who talk of agricultural education are usually thinking in terms of tractors, artificial manures, large scale farms and plantations. Indian farmers are too poor to buy tractors, their land is in too small parcels to permit economic use of many Western methods, and it will take a long time for them to learn the value and ways of using expensive units such as tractors or good bulls co-operatively. The problem is in part a race with time, and there should be the least possible delay.

Compulsory universal education is advocated by many. Excellent as it is, it is a slow and very expensive process; nor is it a cure-all, as the United States has plainly shown. Furthermore, to be sound, it should be much more closely adapted to Indian life and civilization than it is at present. A whole new generation of differently trained teachers must grow up. Wholesale

plastering of Western ideas and ideals onto an Indian mind will not do. Mere literacy is not the source of either wealth or wisdom. By all means let true education proceed as rapidly as possible. But economic strength is a pre-requisite to universal education.

During the winter of 1926-27 Mr. Saklatwala, the Communist M. P., visited India and roundly condemned Mr. Gandhi for not using his talents and influence over the masses to organize them after the fashion of European labour unions, and permeate them with Socialist and Communist ideas. One answer to Mr. Saklatwala is found in the last census figures. They show that the total number of people employed by all industries in both British India and the Indian States combined is only 1,480,123. Comparing this with the 107,000,000 agricultural workers indicates the slight extent to which the atmosphere necessary to trade union organization can possibly exist among the people of India. The history of all European countries shows how enormously difficult it is to organize farmers on a large scale. Co-operative societies are difficult and slow enough, but the labour union type of organization is far slower. In two or three States in America a political type of farmer organization has met with a certain amount of success, but all the conditions are entirely different from those of India. Local autonomous organizations for strictly economic purposes and with indigenous forms and methods may succeed.

Neither Socialism nor Communism have apparently prevented or even mitigated unemployment resulting

from a decrease in international trade. The charkha, however, can do that.

One admires the energy, zeal, altruism, self-sacrifice, courage and sincerity of Mr. Saklatwala, (and indeed of most Communists), but his ignorance of rural India, despite his ancestry, seems considerable. The author is no admirer of Capitalism, but he cannot help observing that Marxians and Communists, like all the rest of us, have their own variety of blind spots.

Another improvement for which there is urgent need is public health work and sanitation of all kinds. But these things also are expensive. The difficulty is plainly set forth by Dr. Norman Leys, M.B., D.P.H., in his book on *Kenya* (pp. 275 and 286). †

“Sanitation is not merely a matter of engineering. In the last resort it depends on personal acts and habits. And these in turn depend on the incomes people have. Our own urban poor were once the despair of sanitarians.... Our partial progress is due mainly to universal and compulsory education and to the rise in real wage rates between 1840 and 1900..... Malaria is fully as hard a problem. It can be prevented by destroying the breeding places of mosquitoes and by protecting people by mosquito nets. The first means constant labour in keeping streams and pools clear of the grass and weeds in which the larvae hide. But there is no money in the villages for either drainage or mosquito nets.... Similarly with ankylostomiasis

†, Hogarth Press, London, 1924.

(hook-worm).....Boots are the real remedy.....Sanitation in Kenya, in short, is a part of economics." That is the case also in India.

Mr. Gandhi fully recognizes the crying need of sanitary reform. From the beginning of his career in India he has urged this, and by simple, inexpensive methods in effect at his Sabarmati Ashram he shows how part of it can be done.

To summarize:—the charkha programme need not displace other efforts toward reform, but it seems to possess certain advantages which make one wonder whether it does not deserve the strongest emphasis among them all. These advantages are the closeness of its adaptation to the ingrained habits and modes of thought, action and institutions of the great majority of the people, its simplicity, its ability *immediately* to produce necessities, its cheapness of installation and operation, the relative simplicity of organization required, its absence of need for any special legislation or Government aid of any sort, its ability to do without foreign capital or indeed of great capital from any source. It taps very great existing but unused sources of physical power and raw materials by simple, inexpensive means, requiring slight skill. It provides one elemental security and removes its provision from the field of profiteering. It does not need as much capital or education as either agriculture or sanitary reform. It is an indigenous industry. It tends immediately to develop the moral qualities of the people, hope, initiative, perseverance, self-reliance, self-respect. It needs a minimum of assistance from "educated" people.

The practise of spinning will lay the foundations, both economically and by reformation of individual and group habits for reforms of other kinds. As Mr Gandhi wrote in *Young India*, Nov. 1, 1925: "Round the Charkha, that is amidst the people who have shed their idleness and who have understood the value of co-operation, a national servant would build up a programme of anti-malaria campaign, improved sanitation, settlement of village disputes, conservation and breeding of cattle, and hundreds of other beneficial activities. Wherever Charkha work is fairly established, all such ameliorative activity is going on according to the capacity of the villagers and the workers concerned."

The khaddar programme is not a cure-all, but it does seem to be the most effective first step toward a renaissance of Indian economic life.

CHAPTER XII

MONEY PRICE CRITERIA

Mr. D. M. Amalsad, Textile Expert to the Government of Madras, states that, "Notwithstanding the large preliminary outlay required for a power-spinning factory, with current quotations for machinery, such a concern should be capable of producing yarns of 20s at a total cost of 11 annas a pound after making ample allowance for depreciation on machinery, buildings, insurance and other charges and after meeting the price of raw cotton. On the basis of a sale price of even Rs. 1 per lb. as against Rs. 1-2-6 quoted in the yarn market at present, the mill will yield a dividend of 16 per cent on the capital invested."* He then proceeds to argue that therefore the mill is better than the charkha, even though the same output of yarn may be secured by the investment of only 1/80th of the initial cost of the mill.

This means, then, that Mr. Amalsad judges the validity of a method of production of material goods by criteria of money prices and money profits. A reading of his pamphlet shows that though he admits the existence of other human needs to be met, yet money is to him the one indispensable, accurate and adequate yardstick. It summarizes and measures all the other factors. In this respect he agrees with most economists, bankers

* *Handloom Weaving in the Madras Presidency* by D. M. Amalsad, Government Press, Madras, 1925, p. 18.

and business men. The development of industrial engineering and sociology, however, has begun to raise some questions.

Suppose we think of capital as being the result of a previous expenditure of energy; human, animal, water-power or fuel. This is in fact the case. Also modern physics tells us that all matter is only a form of energy,—“frozen energy”, as it were. So we might call our capital, whether in the form of money or buildings or equipment, a sort of locked-up energy. It is really a part of the ceaseless flow of solar energy which has been coming to the earth since the dawn of creation. And by enlarging our time sense so as to think of say 100 years as a unit, we can readily see that this temporary storage of energy in the fixed form of a textile mill is like only a little momentary obstruction or eddy or pool in the great stream of energy by which mankind lives. The accounting features of depreciation and obsolescence are partial recognitions of this fact.

Viewed from this standpoint; that is to say, measuring our costs in terms of energy expenditure instead of rupees or pounds sterling, it appears that a textile mill is a far more expensive method of making a yard of cloth than that of the charkha and hand-loom. The manufacture of all the steel girders, the boilers, engines, machinery, tools and other equipment of the mill requires the use of many thousands of horsepower of energy from coal, together with the proportional part of the energy of all the workmen in those factories and machine shops, the coal used in the railway and ocean transport of all that equipment to the place where the

mill is built, and the energy of all the employees of the finished mill.

As compared with this, consider how little solar energy is expended by the men and women who make an equivalent amount of cloth by hand implements. Measured only by labour-units (man-hours) applied directly in the making of cloth, the mill may be 286 times more efficient than the charkha, but measured in horse-power hours and including the energy used in making the buildings, machinery, engines and men and their operation, the charkha is certainly far more efficient and cheaper, per machine or per unit of cloth produced.

Inasmuch as world supplies of fuel energy are increasing in cost,(†) is it not time that economists began to measure economic activities in terms of energy units expended, as well as in terms of money expended? If we believe in having a stable and permanent civilization,—one that will last at least a thousand years,—must we not begin to face the realities of the situation in terms of total fuel energy available to mankind? Is it truly patriotic to live like spendthrifts on our capital of fuel energy, instead of on our annual income of solar energy?

Nor are energy units adequate for such measurements. In the West, efficiency is often confused with speed, so that people come to think that the shortness of time of an operation is an indication of its efficiency. They also frequently confuse mechanical efficiency with economic efficiency. But time is not always an

† See Appendix E.

adequate measure of economic efficiency. To take an extreme example, a house may be taken down very rapidly by dynamite, but such a method might be economically very inefficient because of the destruction of many valuable materials and things in the house and neighbourhood by the explosion. So also, certain machines or factories which produce goods very rapidly may yet be economically inefficient because of their destruction of so many other individual and social values among the owners, employees and consumers. Economic values are probably too complex to be measured by any single unit or standard.

Granted that money is a well established and useful unit for measuring economic activities, nevertheless the results of such measurement do not contain all the economic truth. They must be supplemented by other standards of measurement, by other considerations. Money does *not* summarize all the important economic considerations. Not only are the energy elements imperfectly measured by money, but also the social, psychological, moral and aesthetic elements, which, though often imponderable, are essential to a stable civilization.

Such considerations are implicit in most of the chapters of this book. They enter into the matter of engineering aspects of khaddar, competition, savings of cost, and unemployment. But it is perhaps desirable to emphasize the point and make it explicit. Money alone is not an adequate measure of exchange values for the Indian peasant, partly for the above stated reasons and partly because of the peculiarities of his agri-

cultural and social systems. To apply the money criterion rigidly results in an economic system which condemns him to idleness and India to decay. Let us therefore use more accurate and adequate valuations and measures, and thus help make economics more like a science, more useful and more worthy of trust and respect, and incidentally thereby increase our own wisdom.

In limiting this discussion to purely economic aspects, and using only economic and engineering terms, the author does not at all intend to suggest the desirability of a purely materialistic aim for India. He is not blind to the aesthetic, psychological, humanitarian, moral or spiritual aspects and implications of the khaddar movement,* nor does he believe that these larger considerations are irrelevant to economics. As Mr. Gandhi so well said, "That economics is untrue which ignores or disregards moral values." † Such considerations have entered into all the discussion, though not explicitly. Considerations of space and simplicity forbade. It is the author's belief, however, that the humility and profound love of humanity found in Mr. Gandhi have given him a keener and more profound insight into the economic realities of the situation than could have been attained by any other man who has tackled the problem.

* See his articles, "The Morals of Machinery", *Current Thought*, Madras, Feb., 1926; "Aspects of Spiritual and Moral Beauty in Charkha and Khaddar," *Modern Review*, Calcutta, Nov., 1925. Also an article entitled "Khaddar" by Norah Richards in *Modern Review*, Calcutta, March, 1926.

† Presidential Address to National Congress at Belgaum, reprinted in *Young India*, Dec. 26, 1924.

Mr. Gandhi is one of the very great economic reformers of the world because he so earnestly believes and so steadily insists, and so constantly shows by his own example, that the real change required is a change of heart. The rest is only an outward expression of that accomplishment.

CONCLUSION

As has been seen, I consider the khaddar movement as only one part of a world-wide change affecting the methods, organization and purposes of industrialism. It is not a fantastic aberration of an Indian dreamer, nor an attempted reversion to obsolete and wasteful economic processes, nor a revengeful economic attack upon the West, nor any less "realistic" than other economic movements now in progress in Japan, Turkey, China, Afghanistan and other parts of Asia. It is a mode of increasing the use of solar power, from the current source of supply instead of from the stored sources of coal and petroleum. In this respect it is similar to the industrial movement in the West. For reasons given, I believe that the supporters of the movement may be confident that they are in step with the spirit of the age, despite the appearances which so readily confuse the Western eye.

Mr. Bertrand Russell has recently indicated his belief that industrialism has begun to remove the weight of terrible fears which have oppressed mankind since the dawn of history, and is giving man a new sense of mastery over his environment and life and therewith a new conception of knowledge and a new attitude toward life itself.* In so far as the charkha is also a method of utilizing more solar energy and of distributing the

* "The New Life that is America's"—*New York Times Magazine* May, 22, 1927

resulting wealth more equably, it may in its own way bring about some of the same results.

Each country, for reasons of climate, geographical features, history, customs, etc., has its own peculiar and perhaps best (for it) ways of utilizing solar power (coal, oil, wood, water-power, wind, animal and human power) and its own balance between utilizations of stored and current forms of such energy, and between fixed and mobile tools and equipment and material for living. Each scheme has its own advantages and disadvantages. Interchanges and improvements have of course taken place and will continue to do so. Nevertheless, none of these differences are to be ridiculed or condemned, but all are entitled to respect and should be, if possible, understood.

If, as Fairgrieve asserts,^{*} each civilization in history has been or is, from one aspect, the result of its own peculiar method of utilizing and saving solar energy, the self-conscious revival and expansion of a special form of that utilization in India, as exemplified in the charkha movement, may have an important influence on the whole question of an Indian renaissance.

The discussion in this book bears in a small way upon a number of such larger problems. In addition to being a consideration of the economic validity of Mr. Gandhi's programme, and of one possible aspect of an Indian renaissance, it may be regarded as a discussion of a special instance of the economic validity of all handicraft work versus power-machine industry, or as a discussion of a special method of unemployment

^{*} *Geography and World Power*, cited above.

prevention and relief; or as an indigenous Indian form of co-operation; or as illustrating one phase of the relations between Orient and Occident, or between Western capitalism and some other forms of industrial organization; or as a fragmentary and tentative investigation of part of the problem of the limitation or balance of use of power and machinery in order to secure a fine and enduring civilization.

By way of indicating some of these connections with larger problems, there have been added as appendices E and F some disconnected but perhaps pertinent notes.

In conclusion, if India will develop her three great resources, (i) the inherited manual sensitiveness and skill of her people, (ii) the wasted time of her millions of unemployed, (iii) a larger portion of the radiant energy of the sun,—and if she will distribute the resulting wealth equably among all her people, by the wide use of the charkha and hand-loom,—she can win to her economic goal.

APPENDIX A

CHARKHA AS THE ONLY COTTAGE INDUSTRY *

"In order to understand properly what the Charkha movement means, one must first have a clear idea of all that it does not mean. For instance, handspinning does not,—it is not intended that it should,—compete with, in order to displace, any existing type of industry; it does not aim at withdrawing a single able-bodied person, who can otherwise find a more remunerative occupation, from his work. To compare, therefore, the remuneration that handspinning offers with the earnings offered by any other occupation, to measure its economic value in terms of returns and dividends can only serve to mislead. In a word, handspinning does not claim to satisfy the economics of 'getting rich.' The sole claim advanced on its behalf is that it alone offers an immediate, practicable, and permanent solution of that problem of problems that confronts India, viz. the enforced idleness for nearly six months in the year of an overwhelming majority of India's population, owing to lack of a suitable supplementary occupation to agriculture and the chronic starvation of the masses that results therefrom. There would be no place for the spinning wheel in the national life of India, comparatively small as the remuneration that can be derived from it is, if these two factors were not there. A proper appraisalment of the economic value of the Charkha would therefore involve a consideration of the almost incredible poverty of the Indian masses, and partly of its causes, inasmuch as the remedy is to be sought in the removal of the causes.

The gradual extinction of all of India's principal indigen-

*Two articles by Mr. Gandhi published in *Young India* for Oct. 21 and 28, 1926. Also parts of two other articles by him on the handloom and Charkha as supplementary industries.

ous industries, without any new ones arising to take their place; the steadily growing ruralisation of the country; the deterioration of the existing stock of cattle; scarcities and famines following in quick succession—"one year's failure of rain producing an acute famine where three years of deficient rainfall were necessary to bring about a famine"; the progressive pauperisation of the agriculturist, rendering him incapable of making any improvement in the little bits of his minutely subdivided holding, which are in their turn unfit for the application of new implements and improved methods of agriculture; the control over agriculture of the money-lending agencies driving the agriculturist to concentrate on cotton and aggravating the evil of high prices of food-stuffs; all these and many other factors have combined to make poverty and unemployment the stupendous problem of today. The middlemen of the town and city, dumping manufactured cloth from Lancashire into the villages deprived of their life-giving handicrafts, and the mills which the example of the West has taught us to erect on the ruin of the handicrafts have rendered the solution of that problem more acute by entangling it with the new one of excessively unequal distribution of wealth.

There are Dr. Buchanan's and Montgomery Martin's surveys of Northern India during the first quarter of the nineteenth century to bear eloquent testimony to the villages and towns smiling with plenty, to the vast voluntary organisation that was at work in every town and village, keeping millions of spinners, tens of thousands of weavers, and thousands of dyers, bleachers, carpenters, smiths and smaller handicraftsmen busy throughout the districts, all the year round, and bringing millions of rupees and distributing them equably in Bihar, Bengal, U. P. and Mysore. If official testimony were needed for the contrast the picture of the present day India bears to

* Digby

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that of those days, enough is to be had in the Census Reports. Look at the average size of an agricultural holding in the various provinces:

The average size of a holding in the various provinces.

Province	Size of a holding (in acres)	Province	Size of a holding (in acres)
Assam	2.96	C. P. and Berars	8.48
Bengal	3.12	Madras	4.91
Bihar & Orissa	3.09	N. W. F. Province	11.22
Bombay	12.15	Punjab	9.18
Burma	5.65	U. P.	2.51

(Census Report for 1921—Vol. I.)

It is on these impoverished holdings that 72 per cent. of the population is supposed to subsist. This, says the Census Report, "utilises to the full neither the energy of the worker nor the productivity of the soil." Mr. Thompson, the Census Commissioner for Bengal says: "The number of actual workers in cultivation . . . in British Bengal is 11,060,629. This means 2.215 acres per worker. It is in such figures as these that the explanation of the poverty of the cultivator lies. The cultivation of less than $2\frac{1}{4}$ acres of land cannot employ a man for more than a comparatively small number of days in the year. The cultivator works fairly hard for a few days when he ploughs his land and puts down his crops and again when he harvests them, but for most of the year he has little or nothing to do." "The acreage per worker," says the same writer, is very much larger in all the great wheat-producing countries of the world." Mr. Edye (U. P. Census) describes the agriculture of the Province as involving "very hard work for certain short periods. . . . and almost complete inactivity for the rest of the year. These periods of inactivity are spent in idleness." Thus Mr. Houghton (C. P. Census): "The Kharif crop which is

raised at the end of the rains is the only crop of importance that is grown, and when this crop is gathered there is a scarcity of employment until shortly before the break of the next monsoon." Mr. Calvert, in his book *The Wealth and Welfare of the Punjab* estimates "that the work done by the average cultivator in the Punjab does not represent more than about 150 days' full labour for 12 months." When this is the state of things in a province where the average size of a holding is comparatively very large (9.18 acres), and where the percentage of irrigated area (which keeps the agriculturist better employed than dry areas) is the second highest in India, the state of other provinces can well be imagined.

It is thus clear that all these officials are unanimous on the point that the whole of the agricultural population remains without work for at least half of the year, and one or two have made pointed reference to that fact as the sole cause of the poverty of the agriculturist. When even in Lancashire with an acreage of 21 per peasant it is thought that "it would be a great boon if in bad weather and winter the agriculturists had something to do in their homes of a remunerative character as in days past", * and in Italy with an important textile trade of its own, "the peasant women of almost every district where mulberry trees can be grown are fully occupied with spinning", † the importance of a subsidiary cottage industry connected with agriculture in a country of the vast magnitude of India should need no argument.

But what exactly that subsidiary industry should be has been the subject of much argument—ever since, and only since the inception of the Charkha movement, as let us hope even the critics of the Charkha will recognise. Let us hope that they will recognise that it was the Charkha that first set them

* Green—*Rural Industries of England*.

† Bombay Mill-owners' statement to the Tariff Board.

athtaking. Once they recognise it, one might humbly submit to them the fact that the Charkha is no new invention like *e. g.*, Ford's motor-car ; it is a re-discovery, like the discovery of its own mother by a strayed child. The critic must not forget that the child here is a vast multitude of people, the most conservative in the world, and scattered over a continent nineteen hundred miles long and fifteen hundred miles broad, and the mother the handicraft that gave them all warmth and sustenance.

Once this fact is understood, no one will seriously press the claims of any other industry. Industries there are enough and to spare. Why not try dairying? Well, India is not Denmark which easily possesses 40 % of the butter trade of England. In 1900 Denmark received 8 million pounds from England for butter and 3 million for bacon, the raising of pigs being an important adjunct of the dairy industry. But India cannot find a bigger India to export its dairy products. And no one will ask the India of Hindus and Mussalmans to engage in the bacon-curing Industry. Poultry-rearing and bee-keeping may also be dismissed on the same score, if not on the ground of their novelty and their necessitating technical skill. India cannot today develop her agriculture and increase the one acre per inhabitant that it has today ; for India is not Ireland which has its wonderful Department of Agriculture organising numerous colleges and placing numerous experts at the disposal of County Councils. Nor will any one suggest that the vast mass of people can take up sock-knitting, or cane-work, or basket-making. These do not and cannot command the ready and permanent market that yarn always does. Even today in parts of Bengal and Madras the old tradition of yarn markets continues. Why not have a jute-mill in the jute areas of Bengal, suggests a Bengal Civilian, with unconscious humour. Possibly he is wondering why none of his brother Civilians has suggested the establishment of more cotton mills in cotton

areas. He forgets the jute mills employ today not more than 250,000 labourers, impoverish the jute grower and fatten a few capitalists and middlemen. After 70 years of cotton industry and having some 50 crores of capital the cotton magnates* claim to have given their daily bread only to nearly 1½ million souls representing the families of 370,000 millhands employed by them, and a handful of clerks and superior staff.

But, it is objected, spinning affords only a miserable pittance and is thus an economic waste. It is forgotten that spinning has never been put forward as a principal occupation. It is offered to those who would otherwise waste their time in idleness. Whether two annas per day, or let us say an anna per day, or Rs. 24 yearly is a miserable pittance, is a matter that can be judged by one who has seen the 'chill penury' of the masses with his own eyes. This is no place to discuss the income per head in India. The Indian Economic Enquiry Committee cited estimates of no less than 15 authorities taken at different times. Ever since Dadabhai Naoroji started the chase of that golden hind, a number of others have pursued it, no one yet being recognised as having captured it. But assuming even what appears to be an estimate farthest wide of the mark as the correct one, viz., that of Rs. 116 by Mr. Findlay Shirras, one may like to know if Rs. 24 is not a substantial addition to that income!

Whereas handspinning presents the following special features which render it pre-eminently suitable as a remedy for India's present economic distress:

I. It is immediately practicable, because

(a) It does not require any capital or costly implements to put it into operation. Both the raw material and the implements for working it can be cheaply and locally obtained.

*Bombay Mill-owners' statement to the Tariff Board.

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(b) It does not require any higher degree of skill or intelligence than the ignorant and poverty-stricken masses of India possess.

(c) It requires so little physical exertion that even little children and old men can practise it and so contribute their mite to the family fund.

(d) It does not require the ground to be prepared for its introduction afresh, as the spinning tradition is still alive among the people.

2. It is universal and permanent, as next to food, yarn alone can be sure of *always* commanding an unlimited and ready market at the very doorsteps of the worker, and thus ensures a steady regular income to the impoverished agriculturist.

3. It is independent of monsoon conditions and so can be carried on even during famine times.

4. It is not opposed to the religious or social susceptibilities of the people.

5. It provides a most perfect ready means of fighting famine, as we shall see in Section 2.

6. It carries work to the very cottage of the peasant and thus prevents the disintegration of the family under economic distress.

7. It alone can restore some of the benefits of the village communities of India now well-nigh ruined.

8. It is the backbone as much of the hand-weaver as of the agriculturist, as it alone can provide a permanent and stable basis for the hand-loom industry which at present is supporting from 8 to 10 million people and supplies about one-third of the clothing requirements of India.

9. Its revival would give a fillip to a host of cognate and allied village occupations and thus rescue the villages from the state of decay into which they have fallen.

10. It alone can insure the equitable distribution of wealth among the millions of inhabitants of India.

11. It alone effectively solves the problem of unemployment, not only the partial unemployment of the agriculturist, but of the educated youth aimlessly wandering in search of occupation. The very magnitude of the task requires the marshalling of all the intellectual forces of the country to guide and direct the movement.

What it has actually achieved and promises to achieve must be considered in a separate section."

II

WORK ACHIEVED

"In this section we shall consider how far the claims advanced in the first section on behalf of the Charkha have been realised. This involves a history of the Charkha movement since its inception in 1920, but we shall attempt no such thing. The salient features may be noticed :

1. Organisation ;
2. Work ;
3. What Charkha has done in individual cases and in famine areas.

1. *Organisation.* Instead of the scattered efforts of the beginning, we have a regular organisation with branches in every province and with something like a capital of 15 lakhs, collecting assets and distributing loans, publishing reports of production and sales in the various provinces month by month, collecting and publishing all valuable data ; making experiments in improving the Charkha, the carding bow and the handgin, and popularising them ; receiving yarn from voluntary spinners, accurately testing its quality and directing so far as is possible the various producing centres in the matter of improving the yarn and cloth ; training workers in all the technical processes

from the picking of cotton to the final weaving and dyeing of cloth and making it ready for the market; and organising a Khadi Service.

2. *Work*—The concrete work of the All India Spinners' Association may be noticed under several heads :

(i) Production and sales, effective marketing of the products by hawking and exhibitions (ii) Improvement in the quality of yarn and cloth ; (iii) Reduction in the cost and price.

(i) The figures of production cover only that done under the supervision of the Board. They do not represent such production as has been traditionally in existence in parts of Assam, Rajputana, Punjab, and Andhra, independent of the Charkha movement.

The figures for production for the year 1924-25 total Rs. 1,903,034 as against 949,348 in 1923-24 *i. e.*, more than double. It is not necessary to give the figures for sales as they represent those for production, practically every yard of Khaddar that is produced being sold. Rs. 1,903,034 worth of cloth means 3,806,068 yards of cloth (the average price of a yard being as. 8) which in its turn represents nearly 1,522,427.2 lb. of yarn. Taking 5 yards as the average daily production of a weaver (in view of the temporary inferiority of the handspun yarn in the beginning) and 300 as the number of his active working days in the year 3,806,068 yards production means the labour of nearly 2537 weaver families. Now taking 25 lb. as the average yearly production of yarn of a spinner, (spinning three hours and giving an hour to ginning and carding) 1,552,427.2 lb. means the labour of nearly 60,897 spinners. This is nothing in proportion to the millions for whom we have to find work, but it must be remembered that it is the fruit of only five years' effort, or rather two years' concentrated effort.

These figures, however, are for 1924-25. *The current year* has shown a great advance on the previous year as will

appear from the following comparative figures of work in three principal centres :

TAMIL NADU—MADRAS

(October to February)

	1923-24 Rs.	1924-25 Rs.	1925-26 Rs.
Production	1,84,000	1,96,000	4,10,000
Sales	1,41,000	2,15,000	3,40,000

KHADI PRATISHTHAN

	6 months July to Dec.'24	4 months Jan. to April'25	6 months July to Dec'25	4 months Jan. to April'26
Production	30,000	30,000	1,80,000	90,000
Sales	10,000	40,000	30,000	90,000

COMILLA—ABHAY ASHRAM

	1924	1925
Production	21,013	80,000
Sales	21,822	74,620

PUNJAB

	1924-'25	1925-'26
Production	23,634	51,437
Sales	29,551	45,060

The detailed Khadi statistics being published in *Young India* every other week during the last two or three months are eloquent of the work of the spinning wheel. To take only the important centres, the Khadi Pratishthan (Bengal) regularly gives work to 10,000 spinners and 750 weavers, serving scores of villages; the Ashram at Tiruchengodu (South India) finds work for 2,241 spinners and about 150 weavers, serving 115 villages; the Kathiawar Khadi Depots employ 2,313 spinners

and 120 weavers, serving 121 villages; the Abhay Ashram, Comilla, serves 10,000 spinners and 150 weavers, and about 20 groups of villages. Figures for Bihar and Andhra are not yet available, but the number of spinners can be imagined from the amount of about Rs 60,000 distributed by the Bihar Branch (A. I. S. A.) and Malkhachak Kutir to them; and in the Ongole Taluka alone of the Guntur District (Andhra) there were, in 1925, 9,900 spinners who earned an average daily wage of as. 2, having worked during their spare hours.

(ii) *Improvement in the quality of yarn and cloth* and (iii) *Decrease in the cost and price* may be considered together.

Whereas five years ago yarn of high counts was a rarity not only Andhra but Bihar and Bengal both produce it now. The quality of ordinary yarn is being daily more and more standardised—15 to 20 counts being the usual quality spun everywhere except in Gujarat. Not that we have yet been able to completely perfect the yarn, but the defective yarn may be regarded as a passing phase as is evidenced by the rapid improvement shown as a result of 10 weeks' intensive effort at Satyagrah ashram, Sabarmati. In the first week only 36 spinners out of 100 spun passable yarn of over 50% test, only 3 of them spinning over 70%. The fourth week showed 64 spinners securing over 50 per cent test, 23 of them over 60%, 2 over 70%, and 1 over 80%; the ninth week showed 104 (out of 111 spinners) securing over 50%, 30 of them over 60%, 29 over 70%, 17 over 80%, 4 over 90%, and 2 over 100%. It should be noted that corresponding yarn of 20s, of Calico Mills (Ahmedabad) was of 90% test, Shahpur Mills (Ahmedabad) 85% test, and Commercial Mill 69%.

This is not a solitary instance. All Khaddar Depots are now testing the yarn they receive and have practically decided not to accept yarn under a standard test.

Now as to the prices. Effective decentralisation and integ-

ration of processes is the keynote of the economics of hand-spinning, just as centralisation and the division of processes is the law in large-scale production. Thus in Gujarat where ginning, carding and spinning are done by different persons, the cost of production of yarn was Rs. 0-9-4½ per lb: in Tirupur where the spinner cards for himself, the cost was Rs. 0-6-10½; in parts of Bengal ginning and carding are both done by the spinner bringing down the cost to Rs. 0-5-0.

The result of efforts in this direction has been a remarkable decrease in the cost of production in all provinces except perhaps in Gujarat. The cost and price in Tamil Nadu, in Andhra and in the Punjab show today a 50% reduction over what they were in 1920; 25% over what they were in 1922. In Bengal the Khadi Pratishthan prices still rule high, though they are lower than they were three years ago, but the Abhay Ashram, Comilla has achieved a record reduction. A pair of dhoties (8×44") which cost Rs. 7-8-0 in 1921, cost Rs. 6 in 1922, Rs 5 in 1925 and Rs. 3-12-0 in January 1926; so much so that the Ashram bids fair now to quote prices lower than the Banga Laxmi Cotton Mills. It may be remarked in this connection that the reduction of the price to the extent of 50% is really to the extent of 100% inasmuch as the quality of cloth is certainly 50% better than it was 5 years ago, though we recognise that the reduction is partly due to a fall in the price of cotton during the last two years.

One more thing may be noted. A final stage in the development of the economics of handspinning is reached when the spinner not only performs all the preliminary processes, but begins to stock his own cotton. This was done with wonderful results in Kathiawar last year. They not only had good cotton, but saved a lot of waste, and spun better quality of yarn. At the present time, the whole cotton crop is controlled by middlemen or agents of the mill-owners who take away the cream of

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the harvest leaving only indifferent cotton behind, which is mostly the cotton used by the handspinners, and which partly explains the inferior quality of yarn. When the handspinning agriculturist understands his own interest better, as soon he must, he would automatically stock his own cotton, and spin for personal use— not for wages.

2. What Charkha has done in individual cases and in famine areas.

i. *Individual cases*: Treatment of the Charkha from a purely economic point of view precludes one from describing the moral revolution it has brought about in many an individual case. But the temperance and freedom from indebtedness that have come in the wake of the Charkha are as much economic as moral results. This has happened everywhere, but the results have been on an extensive scale in parts of Gujarat. *Young India* for August '26 describes in an article entitled "A Successful Experiment" the reforming influence of the Charkha in Kaliparaj areas in Surat District and mentions no less than 26 agriculturist families who had holdings of 9 to 34 acres and who were therefore engaged in agricultural operations for a large part of their time, found time to spin during the year 20 to 60 lbs. of yarn. That, by the way, is an indication of the potentialities of the Charkha.

ii. *In Famine Areas*: It is difficult to indicate in brief the way in which Charkha came to be adopted as a relief measure in famine areas. Famines, some might say, occurred in the days of the Charkha too. Indeed they did, but with nothing like the frequency that they have occurred since 1864. The famine of 1777 was more a scourge of God than a famine, but for years after there was no famine. Ever since there have been commissions on commissions which have only emphasised the essential difficulty of State relief. There is reluctance of those unaccustomed to famine to seek relief, there is eagerness of

those accustomed to famine to accept relief; there is demoralisation that follows when families are broken up and half-starved masses become a moving multitude. "The maintenance of the village system is the only means of saving life by preserving order" said Sir Edward Caird. By nothing could this be maintained so well as by taking the means to earn relief to the very door of the famine-stricken *viz*, the Charkha. That is the only work which can be done by young and old, decrepit and infirm, day and night, and without any strain.

Dr. Ray first tried paddy-husking and other forms of relief in the flood and famine areas of West Bengal in 1923-24, found that they were to no avail, and tried the Charkha which worked to perfection. The amount given as spinning, weaving, and ginning charges in the four centres *viz*, Talora, Champapur, Durgapur and Tilakpur was Rs. 38,000. But that is nothing. What can be called a signal achievement is that the Charkha has now made a permanent home in those areas, enabling the people to supplement their slender means and to resist crop failures and floods more effectively than ever before.

But before proceeding to speak of the potentialities of the movement, we may briefly deal with what is represented to be a great obstacle in its progress.

III

IS MACHINE-MADE CLOTH AN OBSTACLE ?

So far we have considered the actual work achieved. That work in itself should contain the promise of its future possibilities. But, it is said, we are not reckoning with the competition of the machine-made cloth. Is it, however, fair to say that there is a competition between the home-made and the machine-made cloth? There can be competition between mills and mills, say foreign mills and indigenous mills, mills driven by steam-power and those driven by electric power. But how can there

be, or rather why should there be, any competition between one which is an essentially vital industry and another which is not? We shall make our meaning clear. Among the most crying needs of the day is relief from the economic distress of the millions of the peasantry—removal of the partial unemployment of the agricultural classes. We have seen in the foregoing chapters that the spinning wheel is the only industry that can give such relief and such employment. We have seen that fifty crores of capital that the mills have sunk can give their daily bread to only $1\frac{1}{4}$ million souls representing the families of 3,70,000 mill-hands who are largely drawn from the agricultural classes. Now supposing that the mill industry expands to the extent of the total cloth consumption of India, will the matter be any the better so far as the starving millions who are badly in need of a subsidiary industry are concerned? Let us see. Our cloth consumption today is 4,661 million yards (1789 mill production plus 1769 imports plus 1103 hand-loom production.*) To produce 4,661 million yards about 1,165 million pounds of yarn be needed according to Coubrough's calculation. Now in the year 1922-23, 239 mills with a spindle equipment of 7,245,119 produced 705 million lb. of yarn with the labour of about 350,000 operatives. Therefore to have 1165 million pounds of yarn it would be necessary to have about 11 million spindles, and to convert the yarn into cloth a corresponding number of looms i.e., 215,655 looms. To work these 11 million spindles and 215,655 looms, the number of operatives will at an outside estimate be 6,00,000. This means that 2,500,000 men at the most can find their living from the industry. And these men are largely lost to the soil. Therefore the mill industry at best can tear from their homes so many agriculturists. It cannot give a single one of them a supplementary industry. The mills

* Figures of mill production and imports are for 1924-25, and hand-loom production are for 1922-23.

and the spinning wheel are therefore dissimilars admitting of no comparison.

Let us now see how many souls the same amount of cloth produced by our home-mills can find employment for. 4,661 million yards of cloth means 1,165 million lb. of yarn. Adopting the same computation as the one we have done in the second section, production of 1,165 million lb. of yarn would require at least 46,600,000 wheels producing 25 lb. a year. This means that 46,600,000 spinners would supplement their income by spinning. Add to these 46,600,000, thousands of ginners, carders, sizers, dyers, carpenters, smiths, and educated organisers and 3,107,033 weavers necessary for the maintenance of the industry. This means about half of the adult agricultural populations of India deducting 61.4 million children under 10 from the total 224 million agricultural people.

And whereas the mills would need an extra 40 to 50 crores of capital very little would be required in the present case i.e., only the money needed for stocking cotton where it is not grown, and for the remuneration of workers occupied in organising the industry. The reasons are obvious. There are already lakhs and lakhs of wheels in the country lying idle which simply need a little dusting and brushing up. The Census Report for 1921 has an incomplete list of the number of handlooms in each province. But the total which does not include the looms in U. P., Bombay, C.P. and Mysore is 1,938,066. The actual number is therefore likely to be as great as, if not greater than, that needed for our total consumption.

Now we have seen in the second section that so far as the consumer is concerned, it has been possible to secure his response to this vital industry and it has been possible for the industry to meet his wants in increasing proportion, for a progressive improvement in quality and cheapness has been steadily maintained. The industry is vital because its conception is based

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as we have seen on economics founded upon life. 'Nations,' says a writer, 'must have an economy that enables them to live'. Here is an industry which will enable the nation not only to live but to live as a nation, to live as a nation producing wealth which is real and equitably distributed, not wealth which in Ruskin's picturesque language "may in verity be only the gilded index of far reaching ruin ; a wrecker's handful of coin gleaned from the beach to which he has beguiled an argosy."

Is it too much to expect the State to protect such a life-giving industry ? Is it too much to expect them to extend it their exclusive protection even as it is extended to a vital service like, for instance, the Postal service ? It is quite usual in some countries to protect the "market rights" of municipalities. And in protecting our "market rights" in respect of Khaddar, Government will but expiate for the sins of their predecessors who strangled the one vital industry of the land.

But assuming that the Government continues to maintain an indifferent attitude, and the home industry has to fight its way under the so-called free-trade conditions, and the buyer is called upon to choose between Khaddar and mill-cloth, let us see how far Khaddar has to compete with millcloth. Let us compare the cost of manufacture of a lb. of cloth by a cotton mill and by the home-organisation.

*Cost of manufacture of a lb. of mill-cloth.		Cost of manufacture of a lb. of hand-made cloth.	
	Pies		
Coal	10'09	Carder's wage	0-1-0
Stores	14'46	Spinner's "	0-3-0
Labour	39'69	Weaver's "	0-7-6
Office & supervision.	3'41	Depreciation in materials	0-0-6
Fire Insurance	1'67		
Municipal and other taxes.	1'57		
Interest	5'66		
Commission on cloth	4'60		
Agent's Commission	0'83		
Income tax & Super tax	1'94		
	<hr/> 83'92		
	<hr/>		<hr/>
	<i>i. e.</i> , 0-7-0		0-12-0
Difference		As. 5.	
Difference per yard		As. 2.	

We see from the above that though we save to the extent of 4 as by the elimination of charges for fuel, stores, commissions and taxes etc., we lose 6 as. extra on the operatives' wages. Thus the consumer who is a pure consumer *i. e.*, who does not card his cotton or spin his yarn has to pay an extra as. 2 for a yard of cloth. As soon, however, as the consumer becomes his own carder and spinner, he saves four annas and the prices of a yard of homespun and a yard of mill cloth are nearly equalised. A final stage in the development of the economics of handspinning is reached when the spinner not only gins and cards for

himself but stocks his own cotton as he once used to do, and as during the last two years a number of agriculturists were induced to do. We have nearly ten million agriculturists growing cotton, if we may take the percentage of the cotton area to the total area under cultivation. If these agriculturists themselves stock their own cotton, as is the objective sought to be attained in the near future, they will have the cloth not only for the weaver's wage, but even cheaper *i. e.* cheaper than the mill cloth, as they will not have to pay any charges for transport as well as the charges for "breaking" and "opening up" bales of cotton when it arrives in the mills, and the middlemen's profits on the purchase of cotton. Nay more. For to an agriculturist growing cotton, the price of a few lbs. casually picked for home consumption before the harvest is marketed, will be of no consequence, and he will therefore have this cloth just for the weaver's wage. This has actually happened in many individual cases.

There are other factors, besides, which, as the industry progresses, will count in the economics of hand-spinning.

i. The cost of manufacture of mill cloth is always bound to fluctuate inasmuch as the industry is not on a philanthropic but on a commercial basis. Thus for instance, in 1924, the cost was double that in 1914. It is likely to increase in the near future, if only because the mill-owners will expect to cover the successive losses during the past three years. Whilst so far as the hand-weaver is concerned his wage is bound to remain stable if not to decrease, as it is not unlikely. For take the case of Tadpatri (South India) where the following reductions in the rates for weaving have been made:

16s	from	0	5	0	per yard	to	0	3	3
12s	"	0	3	0	" "	to	0	2	3
10s	"	0	2	0	" "	to	0	1	3

ii. Another factor is the improvement in the quality of

cotton by the release of agriculturist from the control of the exporter's agent who at present takes away the pick of the harvest.

iii. A third factor is the control on his yarn of the spinner who can go on improving the count and economise the raw material.

iv. The spinner can spin up to 40s and 50s from indigenous varieties of cotton like *roseum*, while the mills cannot spin that count from the variety and will have to fall back on foreign cotton which is dearer.

v. A handloom weaver can introduce special patterns each time he prepares a new warp, for his warp is only about 10 to 30 yards long whereas the mill-warp has to be at least 500 yards and no order for a special pattern can be undertaken unless for hundreds of such pieces.

vi. The handloom weaver can easily introduce various new and variegated weft designs in the end or the border of the cloth, which it is not easy to do in the case of a power-loom.

Whilst we are speaking of handlooms it may be well to dispel a doubt that is often expressed: 'You may not count on handlooms. They must and they will prefer to depend on the mills for their yarn.' that the bulk of the handlooms depend today on mill-yarn is true, for we have not yet reached the perfection in the production of yarn that can easily attract a hand-weaver. But to argue with Marshall, as a Census Commissioner has done, that textile materials are especially adapted for machine treatment, is to fly in the face of the history of the old Indian textile industry. We have of course yet to reach the "fineness and utility" of the Dacca yarn that was declared by a special Commission in 1864 to be superior to mill-yarn in every respect. But as indicated in the preceeding section improvement has been rapid in the direction and still continues.

However that may be, the handlooms must remain partially

idle and the weavers must starve if hand-spinning does not come to their aid. In 1923, 1,103 million yards of cloth was the yield of 19,38,072 handlooms, which gives an average of only a third of its productive capacity or an income of less than Rs. 6 for the weaver, taking 2 annas as the rate of each yard woven. If instead of depending on the limited supply of mill yarn they had a sufficient supply of handspun yarn, such as it is, so that they could increase their average output to even 4 yards a day they would easily get Rs. 15 per mensem.

But the interesting fact to note is that the handloom weaver is being driven day by day to the handspinner. For the mill is "also a rival weaver of cloth and well aware of it." It cannot afford to supply him with yarn to an unlimited extent. "During the war," said the Bombay Millowners' Secretary's letter to Sir Charles Innes, dated September 15th 1925, "there was no increase in spindles, but new looms have been installed at the rate of 5,000 a year. The average annual output per loom has also been increased.....*The result is that the industry which in the early years of the century was largely a spinning one, is now very largely a weaving industry.*" It does not require much argument to see that any system of production that depends for its supplies on a rival system can continue its existence only on the latter's sufferance. As handloom weaving becomes more and more popular and universal, the present competition is bound to become fierce and deadly, and all who insist on encouraging the growth of handloom industry in India, without making provision for the supply of yarn to them from spinning wheels, should beware. They might drive the handloom weavers headlong to ruin and expose themselves to the charge of dishonesty. Handloom weaving presupposes for its existence that of handspinning. They stand or fall together. A Charkha in every home and a loom in every village should be the formula of the new dispensation.

However in the transition stage, a lot of educative propaganda will have to be done. We have to stimulate clean and healthy motives amongst the people, we have to awaken them to livelier consciousness of the fact that cloth made out of yarn spun by the hands of the daughters and sons of the land can never be too dear for them. So long as the mills continue to produce cheaper cloth by exacting a subsidy from the nation in the shape of 'drawing on its capital stock by deteriorating the physique, intelligence and character of the operatives,'² the patriotic citizen must continue to pay the generous subsidy of a restraint in his tastes, of his patriotism, and willingness to pay a higher price."

HANDLOOM v. SPINNING WHEEL †

BY M. K. GANDHI

"It seems now to be generally recognized that India, having more than 71 per cent of her population as agriculturalists, more of whom are idle for nearly six months in the year, needs a supplementary industry and that that industry to be universal can only be hand-spinning. But some contend that hand-weaving is better because it is more remunerative and therefore a better proposition.

"Now let us understand this argument in some detail. It is said that hand-weaving gives about eight annas per day as against one anna from hand-spinning. Therefore if a person works for only two hours per day, he will earn from hand-weaving two annas against one pice in the same time from hand-spinning. It is added that one pice would be no economic attraction to anybody and that if hand-weaving could be

* Sidney Webb.

† *Young India*, Nov. 11, 1926.

presented to the people, it would be wrong to ask them to do hand-spinning *instead*. The protagonists of the handloom contend further that there is no difficulty about getting as much mill-spun yarn as may be required for India's needs, and finally they say that even for the sake of keeping alive hand-weaving, which has hitherto defied the competition of weaving mills, it should be pushed with vigour and determination. Some of the protagonists of hand-weaving even go so far as to say that the hand-spinning movement is mischievous in that it turns people's attention away from the possibility of hand-weaving and misleads them into supporting an impossible industry which has died of its own inherent weakness.

"Let us test this specious looking argument.

"In the first instance, hand-weaving is not a practicable proposition as a supplementary industry, because it is not easy to teach, it has never been universal in India, it requires several hands to work at, it cannot be done during odd moments. It has been and can only be generally an independent occupation and is in the majority of cases the sole occupation like shoemaking or smithy.

"Moreover hand-weaving cannot be universal in the same sense that hand-spinning can be. India needs 4,661 million yards of cloth per year. A weaver weaves on an average three quarters of a yard per hour of rough khaddar. Therefore if all foreign, indigenous or mill-made cloth could be excluded, at the most, nine million weavers working at the rate of two hours per day would be required to produce the whole of our annual requirements. If it be contended that not so many weavers but so many families be occupied, then the two annas for two hours would have to be distributed among many, thus materially reducing the earning of the individual per day.

"Now let us consider the possibilities of spinning. We

know that it was at one time *the universal* supplementary industry of India. Millions have not yet forgotten the art, and tens of thousands have even now spinning wheels in their homes. Hand-spinning is therefore capable of immediate and limitless extension. And as it has been found that ten spinners supply one weaver, against nine million weavers ninety million spinners would be able to add to their earnings what to them will be a material and welcome addition, i.e. at least 25 per cent of their income. I have assumed the very high figure of 40 rupees per year per head to be the average income. Unlike weaving, spinning may be interrupted any moment and therefore it can be done during all odd moments. Spinning is learnt easily and quickly and the spinner begins to draw some thread from the very commencement.

"Moreover, it is wrong to rely upon an unfailing supply of mill yarn. Hand-weaving and mill-weaving are not complementary propositions. They are mutually antagonistic, the tendency of weaving mills, like all machinery, always being to displace the product of the hand. If, therefore, hand-weaving could become a supplementary industry on a large scale, it would have to be solely dependent on mills which would naturally squeeze the last pic from the weaver for the supply of yarn and would scrap it at the first opportunity.

"On the other hand, handspinning and handweaving are mutually complementary as can be today proved from the experience of the existing spinning depots. Even as I write, I have letters from co-workers saying that in their centres they have to send away weavers for want of yarn. It is little known that a vast number of weavers of mill yarn are in the hands of sowcars, and they must be, so long as they rely upon the mill product. The village economy demands that the weaver should receive his yarn not from the middleman but from his fellow-worker the farmer.

"Again, so far as can be ascertained there are at present some twenty lakhs of weavers at work. Every additional loom means an outlay of at least Rs. 15. Every additional wheel need not mean more than Rs. 3½. The Khadi Pratisthan pattern costs only Rs. 2½. And at a pinch, even an improvised *takli* which need not cost anything can be impressed into service.

"Thus the spinning wheel appears to be the only foundation on which satisfactory village life can be constructed. It is the centre round which alone it is possible to build up village reorganization.

"But it is said that one pice per two hours is no economic attraction to even the poor villager. In the first place, the wheel is not meant for, it is not now presented to, any person who has a more remunerative employment. How is it that thousands of women are today walking a few miles daily or weekly to receive raw cotton and the few pice for the yarn they deliver? If a loom were suggested to them, they would not take it up they would not have the time or the ability for it. Town dwellers have no notion of the gnawing poverty of the masses of India. Let us not talk of the machine age in their case. The machinery of Manchester has robbed them of the butter to their bread which the wheel was, for it has been replaced by nothing else equal to it or better. For these, therefore, the spinning wheel is their only hope.

"I do not here examine the more ambitious but chimerical proposals for agricultural improvements. There is room enough for them I have no doubt. But that is a matter of time and education, whereas the ever growing poverty demands an immediate remedy which the wheel alone supplies. The wheel does not displace or disregard possibilities in the shape of such improvements. It is a prelude to them. Wherever it has gone, it is affecting the lives of villagers in a variety of ways, and it

enables the townspeople to establish a living contact with the villagers and their villages.

"If hand-spinning is all you say, how is it that it has not already been universally adopted? asks the critic. The question is quite fair. The answer is simple. The message of the wheel has to be carried to a people who have no hope, no initiative left in them and who would if left to themselves, starve and die rather than work and live. Such was not the case before, but long neglect has made laziness a habit with them. That laziness can only be removed by the living contact and example of men of character and industry playing the wheel before them and by gently showing them the way. The second great difficulty is the absence of a ready market for khaddar. I confess that it cannot for the time being compete with mill-cloth. I will not engage in any such killing competition. The capitalist may for capturing the market sell his calico for nothing. The manufacturer whose only capital is labour cannot afford to do so.....Khaddar is a live thing. But India has lost her eye for the real art and is therefore satisfied with the glossy exterior. Revive the healthy national taste for khaddar and you will find every village a busy hive. As it is, the resources of khaddar organizations are taxed to the utmost, in order to create a market for the article. The marvel is that in spite of heavy odds against it, the movement is making headway. Over twelve lakhs worth of khaddar was sold only last year. But it is nothing to boast of when one thinks of what needs to be done.

"I have thus summarized the case for the spinning wheel as a supplementary industry as against the hand loom. Let there be no confusion of thought. I am not against the hand loom. It is a great and thriving cottage industry. It will progress automatically if the spinning wheel succeeds. It will be bound to die if the wheel fails."

THE FALLACY OF HANDLOOM WEAVING *

Replying to an address at Madras, Mr. Gandhi said, in part :

"You ask me to encourage hand-weaving even through foreign yarn or mill-made yarn inasmuch as, so you say in your address, it is not possible to day to find hand-spun yarn of the fineness you require and in the quantity you require. Now I shall tell you, as a fellow weaver, why I cannot possibly endorse your recommendation. If I endorse your recommendation I hope to be able to show you that it would be bad for you and bad for the class which I have in view and which you also should have in view. You should, as keen and shrewd business men as some of you are, understand that every weaver who weaves yarn which is supplied by foreign mills or even by mills of India places himself at the disposal of and at the tender mercy of the mills. You as weavers should realize that this hand-weaving which you are today controlling to a certain extent will in time to come slip away from your hands as soon as the mills of the world or the mills of India are ready to weave the pattern that you are today exclusively weaving. Let me inform you, if you do not know the fact already, that various able mill-owners of the world are making experiments in order to weave the patterns which are today your monopoly. It is no fault of the mill-owners or the mill industry that that mill industry is endeavouring day after day to take away the monopolies and take this trade into its own hands. To make continuous improvements in its machinery and to make continuous encroachments upon the handicrafts of the world is really the objective and the ideal of these great industrialists. Indeed, it is the condition of their very existence that they should try to take this trade also from off your hands. What has befallen the industry of

* *Young India*. October 13th, 1927.

spinning will most decidedly befall the industry of hand-weaving also if the weaver will not take a leaf out of my book.

....." If you will study the history of the hand-weaving movement in India you will discover that at the present moment several thousands of weavers, have simply been obliged to abandon their trade. Weavers, all of your own trade, Saurashtras, are to day working in Bombay as scavengers. Weavers in the Punjab are some of them hired soldiery and some of them have taken to the butchers trade. And so you will understand why I cannot possibly endorse your recommendation.....I venture to suggest to you that it is to your interest not to ask me to mix up this mill-spun yarn weaving together with this movement which I am leading in all humility. And it is equally to your interest to support this movement so that if it becomes stable, prosperous and immovable, every one of you would find a respectable living."

APPENDIX B

EXTENT OF RURAL UNEMPLOYMENT IN INDIA

The following quotations on this topic are taken from some of the leading Governmental officials entitled to speak from their own investigations, together with other competent authorities. Concurring opinions could be cited almost indefinitely. The only contrary opinion discovered is also quoted and discussed.

Census of India, 1921, Vol. I, Ch. XII, pp, 244-245.

Mr. Thompson, Census Officer for Bengal, wrote :—

.....“This means only 2.215 acres per worker. It is in such figures as these that the explanation of the poverty of the cultivator lies. The cultivation of less than $2\frac{1}{4}$ acres of land cannot employ a man for more than a comparatively small number of days in the year. The cultivator works fairly hard for a few days when he ploughs his land and puts down his crops and again when he harvests them, but for most of the year he has little or nothing to do.....Such figures as these make it very clear that the Bengali cultivator has not nearly as much work to do as will fill his time.....In Bengal the holdings have been so minutely subdivided that there is not enough work for the cultivators, but on the other hand there is no other work to which they can turn their hand. The very rights which the cultivator has in his land and which it has been the object of the tenancy legislation to preserve to him, stand in the way of an adjustment between the supply and demand for labour in this Province. He cannot be expected to sacrifice these rights and go in search of work in industrial centres except in the last extremity, and the only amelioration of present conditions in Bengal that seems possible, is by

bringing work within reach of the cultivator near his own village."

p. 245. "The economic relation between man power and cultivated area has also been discussed in full in Mr. Calvert's recently published book *The Wealth and Welfare of the Punjab*. He estimates that the work done by the average cultivator in the Punjab does not represent more than about 150 days full labour in the twelve months and that even in the occupied days the idea of the Indian cultivator of what constitutes a full day's task is well below that prevalent in more progressive western countries."

p. 270. Mr. Tallents, Census Officer for Bihar and Orissa, says, in reference to hand-weaving :—

"There are periods in the cultivator's year when all the members of his family are busy in the fields, but there are also periods when this is not the case, and when the family are idle. At such times there is much labour running to waste and ample scope for some form of secondary occupation."

p. 271. Mr. Edye, Census Officer for the United Provinces, speaking of cottage industry as ancillary to agriculture, writes :—

"The bulk of the population is agricultural, and agriculture here means ordinarily the growing, harvesting and disposal of two crops in the year, and not the mixed farming familiar in England. Agriculture of this kind involves very hard work for certain short periods—generally two sowings, two harvests, an occasional weeding in the rains, and three waterings in the cold weather—and almost complete inactivity for the rest of the year. In precarious tracts inactivity may be unavoidable for a whole season, or even for a whole year. These periods of inactivity are, in the great majority of cases, spent in idleness. Where the cultivator pursues some craft which will employ himself and his family at times when they are not required in the

fields—a craft in which continuity of employment is not essential—the proceeds of that craft are a saving from waste, and therefore a clear gain. The most typical of such crafts,...and the one which is most widely pursued, is the production of homespun cloth."

p. 274. Mr. Roughton, Census Officer for the Central Provinces, writing of general labour, remarks :—

"Agriculture, on which a majority of the population depends for its living, does not employ labour all the year around. There are large portions of the province in which the *khari* crop, which is reaped at the end of the rains, is the only crop of importance which is grown, and when this crop is gathered, there is a scarcity of employment until shortly before the break of the next monsoon."

India in 1923—24, edited by Rushbrook Williams, Director of Public Information, Government of India. An Annual Statement to Parliament, required by Statute. (Central Publication Branch, Government of India, Calcutta,) p. 197.

"The cultivator in many provinces of India is obliged by climatic reasons to remain idle for more than one-third of the total working days of the year."

Wealth and Welfare of the Punjab by H. Calvert, Registrar of Government Co-operative Department, Punjab. Oxford University Press, London.

"The work done by the average cultivator in the Punjab does not represent more than 150 days full labour for 12 months."

Economic Life of a Bengal District by J. C. Jack,, late Land Settlement Officer, Government of Bengal. Oxford University Press, London, 2d. printing, 1927, p. 39 :—

"The time-table of the cultivator, therefore, when his land is unfit for jute, shows three months hard work and nine months idleness; if he grows jute as well as rice, he

will have an additional six weeks work in July and August."

Some South Indian Villages—by Gilbert Slater, Professor of Economics, Madras University. Oxford University Press, London, 1918, p. 16.

"As in the Madras Presidency, on one-crop land the agriculturalist works for only about five months in the year, and on two-crop land only for about eight months." (He then states that this same condition prevails also in Mysore and all the rest of South India).

p. 245. "At present a condition of chronic under-employment does exist on a very large scale in South India."

Rural Economy in India—by R. Mukerjee, Professor of Economics, Lucknow University, Longmans Green, 1926.

p. 73. *Waste of Labour in India*—"A very careful estimate of Prof. Bhalla shows, on the other hand, that the cultivator in the Punjab works for 278 days only, taking a normal day of 10 hours. His estimate of work refers, however, to the cultivation of a plot of 13.54 acres. But the holdings often are much smaller and give proportionately less work to the cultivator.....In the United Provinces, assuming that the average holding for a family of five is $2\frac{1}{2}$ acres in the medium stiff soil, if the cultivator sows two acres with early rice followed by peas, and half an acre with cane, by working alone he would have enough to occupy him for 250 days in the year. In the light soil, if he sowed *kado* and *arhar*, rotating with barley, on the whole $2\frac{1}{2}$ acres, he would have to work on the average only 150 days in the year. (Report of the Revision of Settlement in the Gorakhpur District, 1918, p. 21). According to Dr. Slater, taking the land of South India all around there is agricultural work for the cultivator only for five-twelfths of his possible working time."

The Indian Rural Problem, unsigned article by "a practical

agriculturalist who has spent many years in contact with it," *The Round Table*, London, June, 1925, p. 533.

"Another great disability is that owing to the inadequate size of village agricultural holdings there is not enough work to occupy the time of either the farmer or his oxen. There is work for a few weeks at ploughing time, at seed time and at harvest. There is also work for some members of the family in guarding the growing crops, but for a great part of the year the farmer has no way of properly filling his day. In a good many parts of India, 50 per cent of the agricultural labourers' time is spent in enforced idleness."

"*The Economic Life of a Punjab Village* by E.D. Lucas, Principal of Forman Christian College, Lahore, published, Lahore, 1922,

....."An ordinary zemindar of Kalimpur (Punjab) with, say, three or four acres of land, and ten hours the normal length of his day, we find that he works about 157 days in the year."

Problems of Rural Life in India, by Prof. N.N. Gangulee, a member of the Royal Commission on Agriculture in India, *Asiatic Review*, July, 1925. p. 431.

"In the absence of any organized rural industries, chronic unemployment has become one of the striking characteristics of Indian rural life."

Wastage of India's Man Power, by R. K. Das, the Modern Review, Calcutta, April, 1927. p. 399 (After quoting from Calvert)

"The present writer's investigation in the United Provinces and Bengal in 1925 also showed that the average peasant or artizan does not have work for more than 7 months in the year."

Similar conditions of unemployment are reported for practically all provinces of India by the following authorities, from whose books I unfortunately failed to copy the pertinent passages at the time when I had access to them.

Land and Labour in a Deccan Village, by H. H. Mann, Agricultural Advisor to Bombay Presidency, Study I, 1917; Study II, 1921, Oxford University Press, London.

The Punjab Peasant in Prosperity and Debt, by M.L. Darling, Oxford University Press, 1925.

Wealth of India, by Wadia and Joshi, Macmillan, London, 1925.

Economic Organization of Indian Villages, Vol. I, Deltaic Villages, Andhra Economic Series, Andhra University, 1926.

Statement Exhibiting the moral and material Progress and Condition of India. 1923-24, (official) P. S. King and Sons London.

Technically, this condition of the peasants might perhaps be more accurately described as great under-employment. But the difference of name does not alter the phenomenon. This difference of terms, however, seems to be the only satisfactory explanation for the extraordinary statement in *India in 1925-26*, edited by Mr. Coatman, Director of Public Information, Government of India. (p.239). that "With the exception of the Anglo-Indian community, and the educated middle classes whose case has already been discussed, there is, broadly speaking, no unemployment problem in India." Yet the term "under-employment" is not used in the context, and the whole passage is very vague and open to diverse interpretations. If he means to refer only to cities, he should have so stated. He does not cite any authority for the opinion. Since the time when the other authorities, above quoted, made their investigations there has been no change in Indian rural conditions sufficient to wipe out or even appreciably ameliorate the unemployment then disclosed. We cannot accept Mr. Coatman's "broad speaking."

APPENDIX C
PROVIDING CLOTH FOR ONE VILLAGE AND
ONE FAMILY *

SUPPLYING CLOTH FOR ONE VILLAGE

"The following things are needed for the manufacture of cloth: raw cotton, a ginning-wheel, a carding-bow, a spinning-wheel and a hand-loom. And in connection with these things we need the following persons: a cultivator, a ginner, a carder, a spinner and a weaver.

"There are only a few places in the country which do not produce cotton. Parts which do not produce cotton may obtain it from other parts of the country which do.

"If there is a good crop, an acre of land yields about 200 pounds of cotton. But the average yield per acre of cotton in India is about 100 pounds.

"One man working on a hand-gin can gin 10 pounds of cotton every day, or 3000 pounds in a year, 300 being taken as the number of working days in the year.

"Similarly a carder can in a year card and sliver 3000 pounds of cotton.

"Working 4 hours a day, one man can spin in a year 50 pounds of cotton into yarn of ten counts.

"One weaver with a family can weave in one year 750 pounds of cloth 27 inches wide.

"If we take 10 pounds of cloth as the annual average requirement of one person, a village with a population of 300 souls can become self-contained in respect of its clothing as

* From an article by Lakshmidas Purushottam in *Young India* October 6 and 13, 1921.

soon as it puts 30 acres of its land under cotton cultivation and gets hold of ginner, carder, 60 spinning-wheels working four hours per day, and 4 weaver families. The needs of bigger villages and towns can be calculated accordingly.

	Rupees
Cultivation charges on 30 acres under cotton, at 10 rupees per acre	300
Revenue assessment on the same at 2 rupees per acre.	60
Cost of carding and slivering 3000 pounds of cotton at 2 annas a pound	375
Cost of spinning the same at 6 annas per pound	1,125
Cost of weaving the same at 8 annas a pound	1,500
Total Rs.	3,360

"We have excluded the ginning charges which are provided for by the sale of cotton seed.

"Thus the village gets 3000 pounds of cloth by a total outlay of Rs. 3,360. This works out at about 1 rupee 4 annas per pound.

"If an enterprising man devotes 2 hours a day to these operations, he will spend no more on his clothing than what he pays for the cotton itself.

"If finer cloth is wanted, there will be an increase in spinning and weaving charges, and there must be more spinning wheels and more looms. And then the cloth produced will naturally be proportionately more costly."

(Since 1921 there have been great improvements in quality and speed of output and lowering of prices, so that the above figures would call for favourable modification. Nevertheless they give a concrete example of decentralized, small-scale, cloth production in India.)

SUPPLYING CLOTH FOR ONE FAMILY*

"Charkha yarn, as it is now being spun, is much coarser than mill yarn. Although there is no doubt that hand-spun yarn will be finer as the spinners get accustomed to the work, yet I shall suppose that average yarn at the moment to be only of 10 counts. In the Indian Mills the counts mostly made are between 11 and 20. The largest quantity of yarn of any single count is 20s. The woven goods made in the mills work out on an average 4 yards to 16 ounces. But with Charkha yarn the present average is 4 yards per 20 ounces or 5 ounces per yard.

ANNUAL YARN REQUIREMENT OF A FAMILY OF FIVE
IS EQUIVALENT TO TWO HOURS DAILY SPINNING
BY ANY SPINSTER IN THE FAMILY

"5 Persons in a family requiring 12 yards per head per year; the total clothing for the family	...	60 Yds.
Monthly requirement of the family on above basis	5	"
Equivalent yarn to 5 yards cloth at 5 ounces of 10 counts per yard of cloth	...	25 ozs.
Working 25 days in the month, yarn daily required is	...	1 oz.
2½ Tolas being equivalent to one ounce, number of tolas of yarn for daily production	...	2½ Tolas.
Equivalent yards at 210 yards per tola of No. 10 as basis	...	530 Yds.
Spinning at the rate of 260 yards per hour, daily requirement spun in	...	2 hours.
For carding and other processes approximately	...	½ hour.

* Quotation from *Cotton (Khadi Manual, Vol. II., Part IV)* by Satis Chandra Das Gupta, Khadi Pratisthan, 15, College Square Calcutta, 1924, pp. 131, 133.

Total labour required in the family per day

for meeting entire clothing needs

... 2½ hours.

Or half hour per day per head.

"If a family will seriously entertain the idea of being independent of the mills of foreign yarn then it is only necessary that the family will have spun 2 hours daily—a single sister putting this labour or others dividing the work with her. It must be remembered that the average family is taken into consideration. It cannot be supposed that a luxurious family living in towns and wearing superfluous cloth will need spin only half an hour per head per day to be independent of the mills. But the average family in the country does not use more than 60 yards per year. At -/8/- per yard it comes to Rs. 30/-. I believe the average family of 5 does not and cannot spend even thirty rupees per year for clothing. The average is overstated for the unit family of five of a cultivator. The average of 12.3 yards includes the luxurious dress of rich and also includes all the trade requirements for cloth such as the sails for boats, the covering for umbrellas, the yardage used for book binding, for the tents and for the kit of the army. The actual average per family of the cultivators and country people is considerably less than 12.3 yards. It is so simple to clothe our whole population from the yarn out of the Charkha that it is a wonder that we are still not fully alive to its significance."

p. 133. "For meeting the normal demand of 12 yds. cloth per head per annum only 2 cottahs of land is necessary." (A cottah of land in Bengal measurement is equal to 1/60th of an acre.)

APPENDIX D

BIBLIOGRAPHY ON INDIAN HAND-SPINNING
AND HAND-WEAVING AND THE KHADDAR
MOVEMENT

(Only books in English are noted)

PUBLISHED BY INFORMATION DEPARTMENT, ALL INDIA
SPINNERS' ASSOCIATION, SATYAGRAHASHRAM, SABARMATI,
B. B. & C. I. RY.

1. *Khaddar Work in India in 1922*. Report by the Khadi Department of All India Congress Committee.
2. *Khadi Bulletins*, 1923.
3. *Report of All India Khadi Board*, 1924.
4. *All India Khadi Guide*, June 1924.
5. *A Khadi Tour*, 1924.
6. *Report of All India Khadi Board Work*, by All India Spinners' Association for 1924-25.
7. *Khadi Guide*, August, 1925.
8. *Report of All India Spinners' Association for 1925-26*.
9. *Charkha Shastra*, Part I, by Maganlal K. Gandhi.
(translated from the Gujarati).
10. *Hand-Spinning and Hand-Weaving* an Essay, by S. V. Puntambekar and N. S. Varadachari, 1926.
11. *The Takli Teacher*, by Maganlal K. Gandhi and Richard B. Gregg, 1926.

PUBLISHED BY KHADI PRATISTHAN, 15, COLLEGE
SQUARE, CALCUTTA

1. *Khadi Manual*, Two vols. by Statis Chandra Das-Gupta, 1924.

2. *Message of Khaddar*, by Sir P. C. Ray. Address at the opening of Khadi Exhibition at Coconada, 1923. (pamphlet).
3. *Charkha* by Satis Chandra Das Gupta. Introduction by Sir P. C. Ray. (pamphlet).
4. *Deshi Rang* by Sir P. C. Ray. (Indigenous dyes and dying).

BY PRIVATE PUBLISHERS

1. *Young India 1919-22*, and Supplements to 1926. A very full collection of leading articles from Mr. Gandhi's paper of that name, including many special articles on hand-spinning, hand-weaving, charkha, and the khaddar movement. Publisher S. Ganesan, Triplicane, Madras.
2. *The Wheel of Fortune*, by Mahatma Gandhi, 1922. Selected articles from *Young India*. Ganesh and Co., Madras.
3. *Art and Swadeshi*, by A. K. Coomaraswami, Ganesh and Co., Madras.

PUBLISHED BY INDIAN PROVINCIAL OR STATE GOVERNMENTS

1. Bihar and Orissa. Superintendent of Government Printing, Bihar and Orissa, Patna.
 - (a) Bulletin No. 2. *A Note on Hand-Loom Weaving in India*, by K. H. Rao.
 - (b) Bulletin No. 3. *Proceedings of the Conference of Director of Industries and Textile Experts and Assistants*.
 - (c) Bulletin No. 8. *The Hand-Spinning of Cotton*, by K. S. Rao.
 - (d) Bulletin No. 9. *A Warping and Sizing Set Suitable for Cottage Weavers*, by K. S. Rao.

- (e) *A Second Note on Hand-Loom Weaving in India* by K. S. Rao.
2. Bombay Presidency. Superintendent, Government Printing and Stationery, Bombay.
- (a) *Notes on the Indian Textile Industry with Special Reference to Hand Weaving* by R. D. Bell.
3. Madras Presidency. The Superintendent, Government Press, Mount Road, Madras, S. C.
- (a) Department of Industries Bulletins.
- No. 17. *Pattern Weaving*.
- No. 20. *Solid Border Slays*.
- New Series.
- No. 15. *Blanket Industry in the Ceded Districts of the Madras Presidency*.
- No. 16. *Woolen Pile Carpet Industry*.
- No. 21. *Development of Cotton Printing and Painting Industry*.
- No. 22. *Development of the Madras Handkerchief and Lungy or Kaily or Industry*.
- (b) *Monograph on the Carpet Weaving Industry of South India* by H. T. Harris, 1908.
- (c) *Cotton Painting and Printing in the Madras Presidency* by W. S. Hadaway, 1917.
- (d) *Handloom Weaving in the Madras Presidency*, by D. M. Amalsad, 1925.
4. Bengal. Bengal Secretariat Book Depot, Calcutta.
- (a) *A Summary of the Cottage Industries in the Districts of Bengal*, 1923.
- (b) *Report on the Survey of the Cottage Industries of Bengal*, 1924. (Out of stock).
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2. *The Charkha Yarn*, by Muntazin Bahadur V. A. Talcherkar, 1925. Published by the author, Topiwala's Mansions, Sandhurst Road, Bombay, 4.
3. *The Basis for Artistic and Industrial Revival in India*, by E. B. Havell. Publ. by The Theosophist Office, Adyar, Madras, 1912.
4. *The Bengal Civil Service and the Cottage Industries of Bengal*, by Mukherjee. Calcutta University Press, 1927.
5. *The Indian Craftsman*, by A. Coomaraswamy.
6. *Hand Loom Weaving*, by H. H. Ghose. R. Cambray & Co., College Square, Calcutta., 1906.
7. *The Advancement of Industry*, by H. H. Ghose. One chapter on hand-loom weaving. R. Cambray & Co., 1910. Calcutta.
8. *Art Manufactures of India*, by T. N. Mukherjee.
9. *Industrial Arts of India*, by Sir G. Birdwood, 1880.
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11. *Survey of the Customs and Textile Manufactures of India*, by Forbes Watson.

12. *Industrial Evolution of India*, by D. R. Gadgill, Oxford Univ. Press, 1924, Some pages on textiles.
13. *Economics of Khadi* by Rajendra Prasad. Publ. by the Secretary, Bihar Charkha Sangha, Muzzaffarpur, Bihar, 1927.
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ON PAGES 4 & 5.

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- Sir Theodore Morrison—*Economic Organisation of an Indian Province*,—John Murray, London, 1906.

APPENDIX E

LIMITATION OF MACHINERY

In a pamphlet entitled *Indian Home Rule* written in 1908, Mr. Gandhi said, "Machinery is the chief symbol of modern civilization : It represents a great sin." In the introduction to its 1921 edition he qualified his remarks on machinery as follows :—"Still less am I trying to destroy all machinery and mills. It requires a higher simplicity and renunciation than the people are to-day prepared for."

In an article in *Young India* for January 19, 1921 he wrote, "I would not weep over the disappearance of machinery or consider it a calamity. But I have no design upon machinery as such. What I want to do at the present moment is to supplement the production of yarn and cloth through our mills, save the millions we send out of India, and distribute them in our cottages." His Presidential address at the National Congress at Belgaum (reported in *Young India* for Dec. 26, 1924) contained this passage : "I wish, too, you would dismiss from your minds the views attributed to me about machinery. In the first instance, I am no more trying to present for national acceptance all my views on machinery, than I am presenting the whole of my belief in non-violence".

Again, in *Young India* for November 5, 1925 he wrote, "Machinery has its place : it has come to stay. But it must not be allowed to displace the necessary human labour. An improved plough is a good thing. But if by some chance one man could plough up the whole of the land of India and control all the agricultural produce, and if the millions had no other occupation, they would starve, and being idle, they would become dunces, as many have already become. There is hourly

danger of many more being reduced to that unenviable state. I would welcome every improvement in the cottage machine, but I know that it is criminal to displace the hand labour by the introduction of power-driven spindles unless one is at the same time ready to give millions of farmers some other occupation in their homes." In the same paper for September 17, 1925 he stated,—“The movement of the spinning wheel is an organized attempt to displace machinery from that state of exclusiveness and exploitation and to place it in its proper state.” In the issue of June 17, 1926, in reply to a correspondent's question, “Are you against all machinery?”, he wrote, “My answer is emphatically, No. But I am against its indiscriminate multiplication. I refuse to be dazzled by the seeming triumph of machinery. I am uncompromisingly against all destructive machinery. But simple tools and instruments and such machinery as saves individual labour and lightens the burden of the millions of cottagers I should welcome.”

Still more recently, in an article in *Young India* for March 12, 1927, he remarks,—“I do not believe that multiplication of wants and machinery contrived to supply them is taking the world a single step toward its goal.....It (the charkha) does not seek to destroy all machinery but it does regulate its use and check its weedy growth. It uses machinery for the service of the poorest in their own cottages. The wheel is itself an exquisite piece of machinery.”

His attitude for all practical purposes, then, is that the use of machinery ought to be limited.

Inasmuch as these views have laid Mr. Gandhi open to much adverse criticism and even ridicule, and thereby raised doubts in some minds as to the validity of the rest of his economic thinking, it may be desirable to examine their possible reasonableness more closely.

It is indisputable that the modern extensive use of machin-

ery depends upon ample supplies of power,—chiefly coal and oil. It is also indisputable that Western nations are facing a gradual decrease in their fuel supplies. In England and Wales there has been since 1883 a gradual increase in cost of mining coal. In Europe the output of coal has been practically stationary for some years.

“The evidence shows that Europe is approaching the actual point of increasing costs of energy, if indeed she has not passed it.....

“Though the day of ultimate exhaustion is measured in hundreds or thousands of years, the day of increasing costs and failing supplies in our (U.S.) Eastern centres of production is measured in scores of years....

“At the present rate of mining a generation will see the end of the Pittsburgh coal in Pennsylvania.”*

“The present supply of energy in the United States is derived chiefly from fuel, the contribution from water power and

* F. G. Tryon and Lida Mann, of Division of Mineral Resources, U. S. Geological Survey, *Mineral Resources for Future Populations*; being Chap. VIII of *Population Problems*, edited by L. I. Dublin Houghton Mifflin & Co., Boston, U. S. A., 1926, pp. 131, 134, 135.

other sources being relatively small. The several sources of power and heat in 1923 yielded energy as follows:—

	British Thermal Units (in trillions)	per cent of total
Coal	17,300	65
Domestic oil	4,400	16
Natural gas	1,080	4
Imported oil	490	2
Water power	1,140	4
Work animals	850	3
Firewood	1,500	6
Windmills	20	0·1
Total	26,780	(approx) 100

.....“Eighty-seven per cent of our energy is supplied by the mineral fuels. Although the United States has a third of the developed water power of the world, we derive from water but four or five per cent of our total supply of energy.....The price of fuel oil over long periods is also controlled by the price of coal....The day of increasing costs in this our most convenient source of energy is imminent. Daniel White goes so far as to predict a world shortage of petroleum in twenty years. Not the least important result will be to throw increased burdens upon coal.” *

“Nor do the substitute sources of energy promise to furnish power and heat on such easy terms as coal. The water power of the United States is sufficient to meet only a part of the burden

* Ibid.

already carried by coal. The tides and winds can no doubt be drawn upon, but so far as we now know, only at great cost, in which one unit of labour and capital yields fewer units of energy than now."

"It may be possible to harness directly the energy of sunlight; yet, so far, no man-made engine can do this as cheaply as the living plant. But we need the plants for materials and food, and our whole corn crop would not make alcohol enough to replace gasoline. The energy in an entire year's production of human foods in the United States is equal to only three per cent of that in our annual output of fuels.

"There remains the possibility of utilizing the energy locked up in the atom.—(Then follows a quotation from Ruth-erford, the great British physico-chemist, to show that this is a fading hope). "To count upon atomic energy to support our future population is an act of faith. The realities of the world as we now know it leave us dependent on coal.

"As far as the minerals are concerned, the evidence forecasts in the not distant future a period of diminishing abundance and rising costs, in which—barring some revolutionary discovery of science that will free men from dependence on fuel and water power—it will be harder to maintain even our present population at present standards of living." *

As to the dangers of rapid exhaustion of fuels there is some difference of opinion among the authorities. For example, see the article by James O. Lewis, late Chief of Petroleum Division of U. S. Bureau of Mines, in *The Literary Digest* (New York), Sept. 4, 1926; also Anton Mohr—*The Oil War*, published by Martin Hopkinson, London, 1926, the last

* Ibid, pp. 135, 137. See also preliminary Report of the Federal Oil Conservation Board, Sept., 1926; Superintendent of Government Printing, Washington, D. C., U. S. A. Parts are quoted in *Literary Digest*, (New York) for Sept. 25, 1927.

chapter. But there seems to be no dispute as to the increasing costs of power. Indeed, nowadays, a part of the expense of the armies and navies of the United States and Great Britain may fairly be included in estimating the costs of petroleum. (Cf. Anton Mohr—*The Oil War*; La Travaye—*The World Struggle for Oil*—Allen & Unwin, London; R. P. Arnot—*The Politics of Oil*, Labour Publishing Co., London 1927). The situation is doubtful enough at least to make the idea of limitation of machinery in a country like India not unreasonable.

If these things be so, Mr. Gandhi's idea of limiting machinery does not appear so fantastic. He merely proposes to do voluntarily now that which others will eventually be forced to do. True, his reasons are different, but that does not diminish the wisdom of his proposal. *

Those to whom such a prospect seems dismal may find comfort in the fact that "The glory of Greece did not rest upon coal, and there are many worse things than a reduction in the standard of living." †

We need to correct our perspective. As James Fairgrieve in his *Geography and World Power* remarks (p. 349):—

"Stores of coal and petroleum are of the nature of capital which has been accumulated long ages past, and in using them we are not really accumulating energy at all; they are on a somewhat different footing from the energy which man makes his own, in almost the only way possible till 130 years ago, by eating food which has grown by the sun's energy within a few days or months of its consumption. The use of coal energy is something in the nature of an incident. In the midst of the changes which the Industrial Revolution has brought, we are

* It is interesting to note that the old Indian law-giver, Manu, condemned the ownership and operation of large machines by private individuals as a minor crime. (Manu XI, 63, 64, 66).

† Tryon and Maun, above cited.

in danger of forgetting that it is an incident, and that solar radiation is the final source of by far the greatest amount of energy available on the earth's surface, and especially that vegetation now growing supplies the energy in the most convenient forms; culture of the soil, horticulture and agriculture and arboriculture, whether it be the oldest trade or not, is certainly the most fundamental."

Machinery is one mode of using solar energy. Handicrafts are another. Machinery uses more energy than handicrafts, but not necessarily for finer or higher purposes or with better aesthetic or moral results. After all, science itself by one of its most recent developments,—the theory of relativity,—teaches us that mere size or quantity or speed are only relative and nothing to be especially proud about. They are wholly a matter of the position or attitude or movement of the observer, and probably do not count as ultimate values.

Machinery has in itself defects as well as advantages. Most of these defects are very ably explained by Mr. Austin Freeman in his *Social Decay and Regeneration*, referred to earlier in this book. One such weakness which he does not discuss is the heavy "overhead" burden of expense for machine repair, maintenance, depreciation, obsolescence, insurance, interest, and taxes. In conjunction with capitalistic control this burden tends to create financial instability and very great concentration of economic power. As a tendency to the avoidance or mitigation of such evils, ideas as to the limitation of machinery may not be altogether foolish or repugnant.

Limitation of machinery seems desirable to Mr. Gandhi on both economic and moral grounds. Formerly I fully agreed,* but on further thought it seems to me that most of the evils involved, or those which are most serious, are due more to

* See my article "The Morals of Machinery", in *Current Thought*, Madras, for July, 1926.

capitalism than to machinery. Doubtless the power working through machinery makes the evils greater, more widespread and glaring. But the intrinsic evil is in men, not in externals *. Part of the harm arises also simply because people do not really understand what are the real full implications and results of the uses of machinery and its connections with capitalism and the institution of property.

Of course nobody is so silly as to imagine that one man can put an end to machinery or industrialism, but nevertheless, history has often shown that man may focus and express the inarticulate attitude of millions of his contemporaries, and may voice the posture and tendency of otherwise unnoticed social or economic forces. It is conceivable that Mr. Gandhi, through an unusual intuitive sensitiveness, is expressing the peasants' instinctive recognition of the soundness of utilizing annual solar energy income to the utmost; or is stating an Asiatic preference in favour of a decentralized social life and culture and those things which make it possible; or is giving shape to a selective tendency in favour of some new type of integration of social and economic units which may promote a more organic wholeness among mankind. Presumably machinery will run its course in America, at least. Asia may not put an end to industrialism even in her own house, but she may divert its course or manner of action sufficiently to make it of more

* Mr. Gandhi incisively criticises this idea by pointing out that when something lends itself more readily to evil than to good uses, as in the case of distilled liquor, it may be fairly called an evil thing. But I think that if capitalism as a motive and mode of industry should cease to exist, much machinery would disappear also, and what remained would no longer lend itself more readily to evil than to good. Ultimately perhaps one's philosophic concepts and attitudes determine one's position on this point.

service to ultimate human values. Simple peasant conservatism is sometimes more profoundly wise than we realize.

Whatever modification or limitation thus may come about would of course not be by moral or legislative fiat, but by the positive actual development and widespread use of other methods of transforming solar power and of distributing the results, and the organization of both.

If the use of machinery or power ought to be controlled or restricted, it is very difficult to see what principle to follow. To me the surest basis would seem to be on the assumption of some sort of a symbiosis or mutual support and aid between man and Nature, and the recognition of a far closer symbiosis between man and man than is implied in capitalism. This may of course be stated in purely moral or spiritual terms also. Machinery and power must be subordinated to the true welfare of humanity. Such a concept would involve dropping the idea of man's "conflict with Nature," of his "conquest of Nature", and developing instead an active belief in an actual unity and harmony with Nature and matter, and between men of all nations. Such an idea is quite acceptable to Indian thought, however strange or absurd it may seem to Western readers who have not followed closely the most recent developments of science. *

It is because of this failure in symbiosis or of balancing energy accounts that machinery, with its unrestrained use of stored-up power, may be said, in terms understandable in the West, to "represent a great sin" (mistake), as Mr. Gandhi has said. † The creation of unemployment in both England and

* See A. N. Whitehead—*Science and the Modern World*—Cambridge Univ. Press, 1926, and J. C. Bose—*Plant Autographs and Their Revelations*,—Longmans Green, London, 1927.

† In this connection it is interesting to note that in the original Greek of the Christian New Testament, the word which in

India by machinery and the actually greater inefficiency of power-driven machinery in terms of total units of solar energy consumed (as explained in the foregoing chapters) may also represent mistakes.

"What is, humanly speaking, profitable may involve a dead natural loss, and this loss, may inflict great injury to the community or the race as a whole in the long run. In the interests of the solidarity of the race itself, man has his obligations to Nature as the matrix of the community, and such obligations involve the social use of the gifts of the earth (*munera terrae*) and socialized satisfactions, which alone can satisfy the lofty ideal of communalism,—the participation of every man in the common inheritance of the earth and the fruits of humanity." *

"A permanent civilization must learn to balance its energy budget, to collect each year from the inexhaustible sources of water, wind and sun as much power as its expends." †

It may well be that the great stability of the civilizations of China and India has rested upon their closer approximation to such a balance of energy resources or to a symbiosis with Nature than there was or is in the case of other civilizations, together probably with their decentralized, small-scale, loosely integrated economic and social organizations. Even in matters of economics Europe and America may yet find that they have much to learn from Asia. ‡

* R. Mukerjee—*Principles of Comparative Economics*, P. S. King & Son, London, 1921, Vol. I, pp. 88 et seq.

† Tryon and Mann, Chap. VIII of *Population Problems* ed. by Dublin, above cited.

‡ See F. H. King—*Farmers of Forty Centuries*—Harcourt, Brace & Co. New York, 1927.

the English version has been translated as "sin" meant literally "to miss the mark," or "to err".

APPENDIX F
TWO ASPECTS OF FUTURE RELATIONS
BETWEEN ORIENT AND OCCIDENT

In every part of Asia there are the multitudinous problems involved in the meeting and partial fusion of two cultures,—the Eastern and the Western. It would be easy to recite and to grow indignant and sorrowful over the mistakes, wrongs and injustices done and still being done in this contact. But this book is not the place for that.

The situation makes a very troubled period, yet history tells us that out of such meetings, where there has been strength on both sides and an organic selection and blending, greater and finer civilizations have arisen.

All lovers of humanity, whether of the East or West, desire to have their respective nations purged of dross, correct their mistakes and march on to a nobler future. Each of these two great cultures believes that it has something great and fine which the other needs. Each, despite aversions, resentments, hatreds or prides, is aware of weaknesses within itself, yet doubts whether the other can help it.

The problem for both East and West is, how can we avoid the mistakes of the other; what portions of the experience of the other are universally valid; and how can we make a wise selection and application thereof, so as to have them become an organic part of our culture without destroying that part of our heritage which we wish to preserve?

A number of critics believe that Western civilization has now begun to decay. Whether or not this is true is perhaps not a matter of ultimate and absolute importance; for after all, civilizations and institutions are group habits, and humanity

marches on despite changes of habits ; and the spirit of the best achievements of each group is not lost. Indeed, whenever the spirit of men becomes hampered either by rapid growth of itself or by hardening of a temporal shell, the shell must perish in order that the spirit may live. "Except a grain of wheat fall into the ground and die, it abideth by itself alone ; but if it die, it beareth much fruit." Think, for instance of the spirit of ancient Greece. The Roman Empire died, but the descendants of the peoples who composed it are still active. The greater question, then, is what each civilization can best give to the rest of the world and to the future.

The West has very much to learn from the East,—much more than it even dreams of at present. But I am not fitted to discuss that.

Many men of both East and West believe that capitalistic industrialism and commercialism are a mistake, and not a good thing for any part of Asia to try to incorporate within its culture. The author is one of these. Yet he does not endorse Socialism, however fine its motives. But many do believe that Western science, aside from certain of its applications, is a great gift to the world and worthy of adoption by all cultures and civilizations, provided certain controls or correctives are applied. Such modifications might come from the philosophy of Aurobindo Ghose, the poetry and music of Tagore, the love and humility of Gandhi, and from certain qualities which the Chinese and Japanese can best contribute. That is, science needs to be supplemented by finer, more subtle, more profound, and more completely integrated and unified perception and understanding of mental, moral and spiritual orders, and the translation thereof into all the details of daily life and sharing of life.

In the last very few years, by the work of men culminating in Einstein, Weyl, Eddington, Whitehead, Russell, Haldane-

and Bose, science has been largely shorn of its false pride, purged of its materialistic philosophy, broadened, rendered more humane, tolerant and ready to accept the truths of poetry, art, religion and mysticism. *

The present attitude and position of science will make it much more acceptable to India than it was formerly. Indeed, certain of the philosophical implications of the most recent mathematical physics are in astonishing harmony with many of the ideas of the old seers of the Upanishads.

Yet in view of the doubts of many of the fine minds of India as to the value of science, we would like to quote from one of her clearest observers and profoundest thinkers. Sri Aurobindo Ghose, in an essay on "Materialism", † which seems to us the best estimate of that subject ever written, says in part:—

"Examine impartially its results. Not only has it immensely widened and filled in the knowledge of the race and accustomed it to a great patience of research, scrupulosity, accuracy,—if it has done that only in one large sphere of inquiry, it has still prepared for the extension of the same curiosity, intellectual rectitude, power for knowledge to other and higher fields,—not only has it with unexampled force and richness of

* See A. N. Whitehead *Science and the Modern World*—Cambridge Univ. Press, 1926; G. N. Lewis *The Anatomy of Science*—Yale University Press, New Haven, U. S. A., 1926; A. S. Eddington *Space, Time and Gravitation*,—Cambridge Univ. Press, 1923; Lloyd Morgan *Emergent Evolution*, and "Life, Mind, and Spirit," J. W. N. Sullivan *Aspects of Science*, Second Series—Collins, London, 1926, also his *Tyranny of Science*—Kogan, Paul, London, 1927; J. C. Bose *Plant Autographs and their Revelations* Longmans Green, London, 1927; J. Arthur Thompson *Outline of Science*, J.P. Putnam's Sons, London, 1922; H. Poincaré *Science and Method*.

† In a pamphlet entitled *Evolution* Published by Sarat Chandra Guha, Arya Publishing House, College St. Market, Calcutta.

invention brought and put into our hands, for much evil, but also for much good, discoveries, instruments, practical powers, conquests, conveniences which, however, we may declare their insufficiency for our higher interests, yet few of us would care to relinquish; but it has also, paradoxical as that might at first seem, strengthened man's idealism. On the whole, it has given him a kindlier hope and humanized his nature. Tolerance is greater, liberty has increased, charity is more a matter of course, peace, if not yet practicable, is growing at least imaginable.....

"Humanity is not the highest godhead; God is more than, humanity; but in humanity too we have to find and to serve him. The cult of humanity means an increasing kindness, tolerance, charity, helpfulness, solidarity, universality, unity, fullness of individual and collective growth, and toward these things we are advancing much more rapidly than was possible in any previous age, if still with sadly stumbling footsteps and some fierce lapses."

"Progress is the very heart of the significance of human life for it means our evolution into greater and richer being..... Outward progress was the greater part of its aim and the inward was more essential? but the inward too is not complete if the outward is left out of account. Even if the insistence of our progress fall for a time too exclusively on growth in one field still all movement forward is helpful and must end by giving a greater force and a larger meaning to our need of growth in deeper and higher provinces of our being.....No doubt, again, the essential is an inner freedom; but if without the inner realization the outer attempt at liberty may prove at last a vain thing, yet to pursue an inner liberty and perpetuate an outer slavery or to rejoice in an isolated release and leave mankind to its chains was also an anomaly that had to be exploded, a confined and too self-centered ideal.".....

"Science is a right knowledge, in the end only of processes but still the knowledge of processes too is a part of the total wisdom and essential to a wide and clear approach toward the deeper Truth behind.....We can now see too how it was bound to escape from itself by the widening of the very frame of knowledge it has itself constructed.

....."Man does need to develop firmly in all his earthly parts, to fortify and perfect his body, his life, his outwardgoing mind, to take full possession of the earth his dwelling place, to know and utilize physical nature, enrich his environment and satisfy by the aid of a generalized intelligence his evolving mental, vital and physical being. That is not all his need, but it is a great and initial part of it and of human perfection. Its full meaning appears afterwards ; for only in the beginning and in the appearance an impulse of his life, in the end and really it will be seen a need of his soul, a preparing of a fit environment for a diviner life. He has been set here to serve God's ways upon earth and fulfil the Godhead in men, and he must not despise earth or reject the basis given for the first powers and potentialities of the Godhead.

....."Adhering still to the essential rigorous method of science, though not to its purely physical instrumentation, scrutinizing, experimenting, holding nothing for established which cannot be scrupulously and universally verified, we shall still arrive at supraphysical certitudes.....

....."Three things will remain from the labour of the secularist centuries ; truth of the physical world and its importance, the scientific method of knowledge,—which is to induce Nature and Being to reveal their own way of being and proceeding, not hastening to put upon them our own impositions of idea and imagination, *adhyaropa*,—and last, though very far from least, the truth and importance of the earth life and the human endeavour, its evolutionary meaning. They will remain, but wil,

turn to another sense and disclose greater issues. Surer of our hope and our labour, we shall see them all transformed into light of a vaster and more intimate world-knowledge and self-knowledge."

A POSSIBLE MODIFICATION OF CAPITALISM

In regard to capitalism, one of the most brilliant of British economists, Mr. J. M. Keynes (editor of *The Economist* and of the *Nation and Athenaeum*) writes in his little book, *The End of Laissez Faire* *:-

"For my part I think that Capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative system yet in sight; but that in itself it is in many ways extremely objectionable. Our problem is to work out a social organization which shall be as efficient as possible without offending our notions of a satisfactory way of life.

"The next step forward must come, not from political agitation or premature experiments, but from thought. We need by an effort of the mind to elucidate our own feelings. At present our sympathy and our judgment are liable to be on different sides, which is a painful and paralyzing state of mind. In the field of action reformers will not be successful until they can steadily pursue a clear and definite object with their intellects and their feelings in tune. There is no party in the world at present which appears to me to be pursuing right aims by right methods. Material poverty provides the incentive to change precisely in situations where there is very little margin for experiments. Material prosperity removes the incentive just when it might be safe to take a chance. Europe lacks the means, America the will, to make a move. We need a new set

* The Hogarth Press, London, 1926.

of convictions which spring naturally from a candid examination of our own inner feelings in relation to the outside facts."

To me, Mr. Keynes' assumption that capitalism can be wisely managed appears fundamentally and ultimately impossible. The principle of capitalism as defined by Mr. Keynes himself, viz., "the dependence upon an intense appeal to the money-making and money-loving instincts of individuals as the main motive force of the economic machine", is contrary to the fundamental spiritual and moral unity of mankind. That is why capitalism troubles our hearts, as Mr. Keynes admits in the above quotation. That which is intrinsically false cannot be wisely managed.

But it seems quite possible to me that something like Mr. Gandhi's programme, together with decentralized, small-scale social and economic units, integrated on some other basis than that of existing States, might well prove the basis for the next step forward. Under his programme it seems possible to "pursue a clear and definite object with their intellects and feelings in tune." In this book I have tried to show the real import of outside facts whose relation to Mr. Gandhi's and perhaps our own inner feelings has provided for him and will perhaps provide for others a new set of convictions, such as Mr. Keynes urges. Just as in the early history of the world, forms of marine animal life are said not to have developed lungs and means of living in the air on land till they were forced in sheer desperation to do so by the attacks of more powerful enemies so it is possible that India, out of the desperation of her poverty, may develop for the world a new mode of social and economic life superior to that which has gone before.

